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The National Tool and Die Journal

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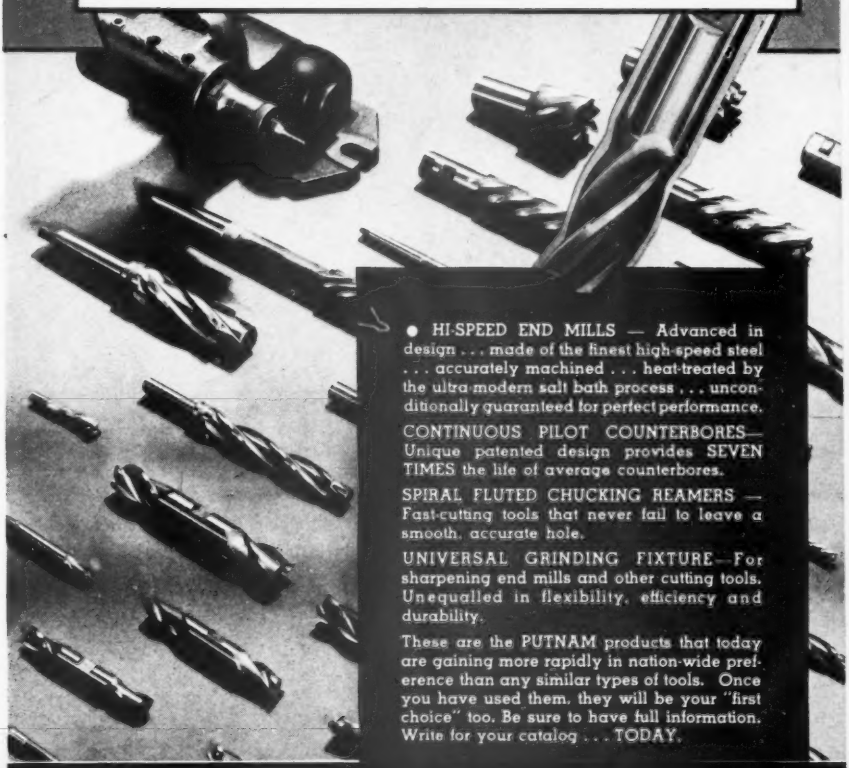

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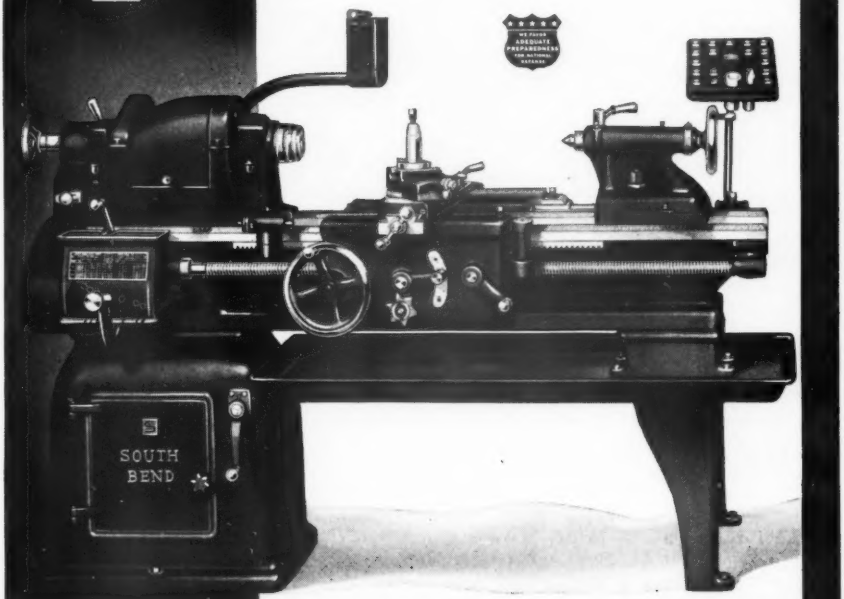

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TOOL·DIE·MACHINE

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The National Tool and Die Journal

Circulated monthly to executives and department heads responsible for designing, building and using Precision Tooling.

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Editor George J. Huebner

Assistant Editor Paul L. Reed

Official Organ of the Special Tool, Die and Machine Shop Institute

Vol. 6 NOVEMBER, 1940 No. 8

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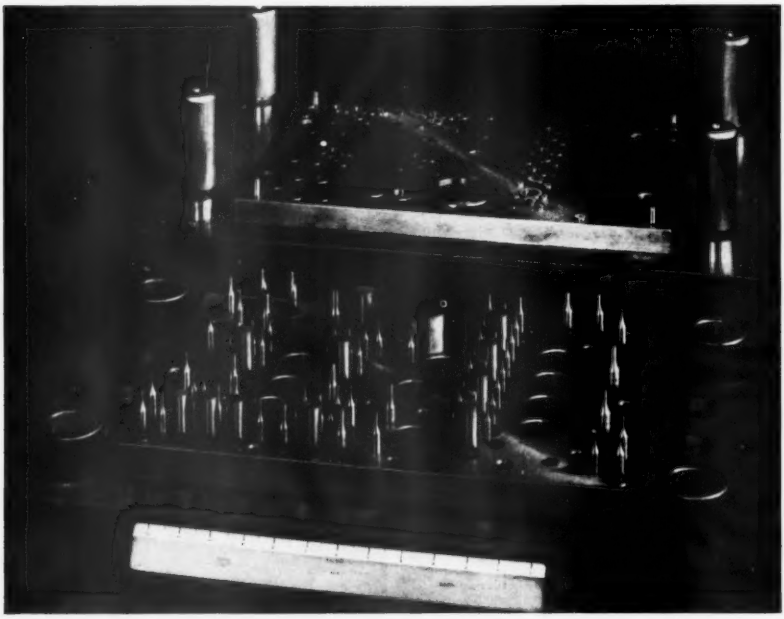

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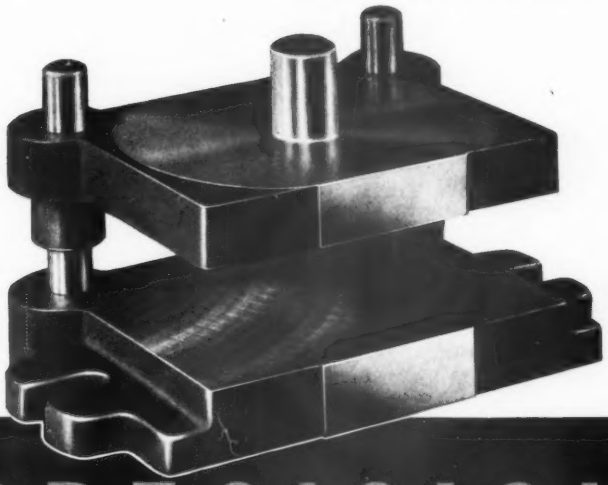

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Chas. M. Gray, Advertising Counsel

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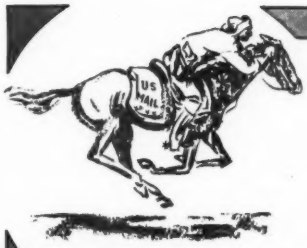

Time was when the Pony Express was the ONLY means of communication to many parts of the country. It is unnecessary to point out that as needs grew, so also did the efficient handling of those needs grow.

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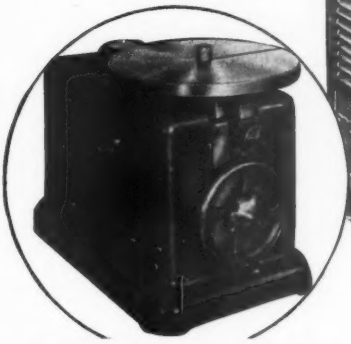

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Literature on both the regular Grindrite and Grindrite Jr. will be sent on request. Ask for Catalog and list of users.

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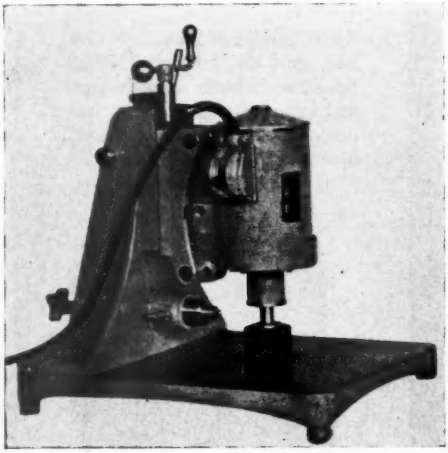
Height .....Approx. 58 inches
Floor Space .....Approx. 29" x 33"
Weight .....Approx. 600 lbs.
Motor: 1 HP—1750 RPM—220 or 440 V.
Grinding Wheels: 8" dia. 3½" face.

The *Grindrite Jr.*, a portable bench type grinder, is unusually rugged for its size and weight—it is of particular value in shops which handle a large number of small dies and die parts.



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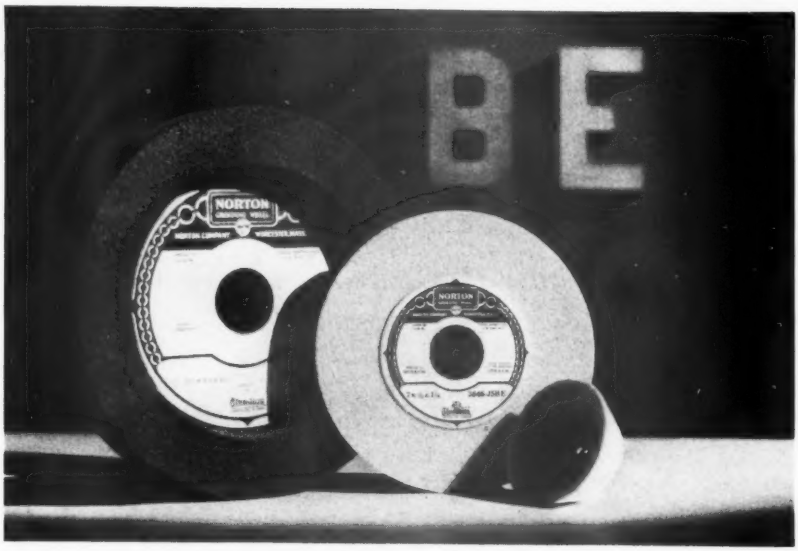

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Note how carefully the column of a Milwaukee Vertical Milling Machine has been engineered for the proper distribution of metal — an inside horizontal wall divides it into a double box section, the cross mounting of the motor permits a solid rear wall, which, together with the solid front face, assures an unusually rigid structure.

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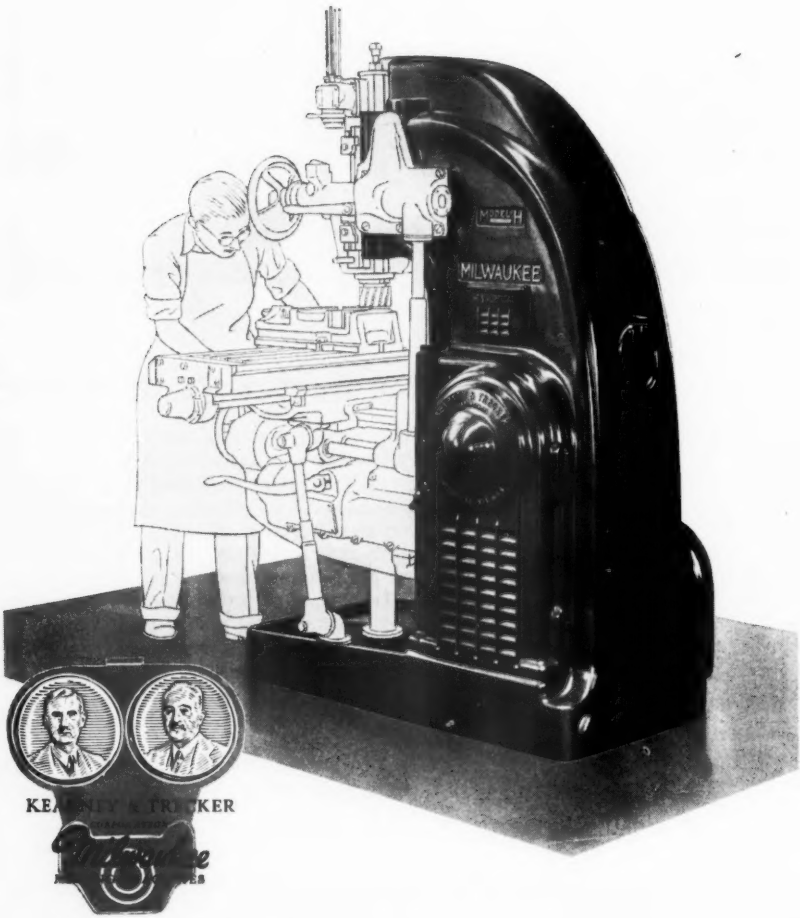


MILWAUKEE MILLING MACHINES

TOOL · DIE · MACHINE PROGRESS
The National Tool and Die Journal
NOVEMBER, 1940 Vol. 6, No. 8

Automotive Tooling and Production Methods for Aircraft

A notable industrial co-operative effort in the interest of National Defense

BY GEORGE J. HUEBNER
Editor

THE Automotive Industries have responded to the National Defense Advisory Commission's call for assistance in speeding up aircraft production by joining in an important co-operative effort. The Automotive Committee for Air Defense, as the steering organization is known, represents the automobile and motor truck manufacturers, the body and parts manufacturers and the contract tool and die builders. Their co-operation, not only with each other, but with aircraft manufacturers, the U.S. Army Air Corps and the National Defense Commission provides a noteworthy example of effective industrial collaboration.

C. C. Carlton, president of Motor Wheel Corporation, has been elected Acting Director of that Committee. Other members are K. T. Keller, president of Chrysler Corp.; Edsel Ford, president of the Ford Motor Company; C. E. Wilson, president of General Motors Corp.; L. D. Adams, general manager, Associated Spring Corp.; I. B. Babcock, president of Yellow Truck & Coach Co.; W. P. Brown, president of Briggs Mfg. Co.

Unusual interest centers in this inter-industry effort because its purpose is to apply automobile tooling and production methods to airplane manufacture, specifically for the building of some 12,000 bombers.

The fact that the airplane, as it is now being manufactured, is still to a large extent "hand made" necessitates *fundamental* tool designing and production engineering studies. To this end, the facilities of the members of the Automotive Tool and Die Manufacturers Association—Detroit division of the Special

(Continued from Preceding Page)

Tool, Die and Machine Shop Institute—have been made available and also T·D·M industry shops in other districts who have suitable equipment and whose commitments permit may join in the undertaking.

The change-over from today's methods to quantity parts production involves principally die and press work. Bomber parts and assemblies similar to those which are to be put into production have been brought by plane to Detroit. They are on display in the Graham-Paige administration building where research and engineering headquarters have been established by the Committee. These parts and drawings are being studied to determine design changes necessary to get into efficient stamping press production.

It is the present plan to have the automotive co-operative group manufacture 12,000 sets of some 400 different parts for plane fuselages as well as wing and tail assemblies.

Of equal importance following such production is the rapid assembly of parts, probably in the form of sub-assemblies. To this end, present methods in airplane plants will be studied, then jigs, fixtures, and other types of tools and accessory equipment will be designed and built. Final assembly, as now contemplated, will probably take place in the plants of those aircraft manufacturers to whom Government orders have been awarded.

Identification of all individuals representing firms who wish to participate in the program is required by United States Army Air Corps regulations. An identification card issued by the Automotive Committee for Air Defense and countersigned by accredited industry or association executives is required for admission.

In this industrial effort two important facts stand out:

(1) It is a notable co-operative effort of industries or at least such portions of them as can participate by virtue of their geographic locations. Tool design and production studies are being undertaken by men who normally are competitors. Their efforts are being coordinated through the medium of an operating committee which is representative of all groups.

(2) *Tooling* in its broadest sense is recognized as the important primary activity which must precede every other in mass production procedure. Upon the dies, jigs, and tools of every description, which are specially designed, depend both quality and quantity of parts.

It is interesting, also, to observe that the automobile industry, which is credited with the present high state of development of mass precision manufacture, in collaboration with those industries which supply its tooling, dies and parts, is, in this national emergency, extending and adapting its tooling and production methods to the needs of the aircraft manufacturer.

This is voluntary industrial co-operation at its best. It is The American Way. Its possibilities are unlimited.

Die Designing and Estimating

By CHARLES BOHMER

and

GEORGE DANNES

Article VII of a New Series

The break in the publication of this series was caused by unavoidable delays the authors encountered in their regular work which has been extremely heavy. Also Mr. Bohmer has had the duties as instructor in die design at the Carl Schurz High School in Chicago, the course again under the auspices of the Chicago Division of the Special Tool, Die and Machine Shop Institute.

We hope to be able to continue this series at regular intervals.

—*The Editor*

Design and Estimate of a Progressive Pierce, Cut-Off and Form Die

Analysis of Design and Application of Method for Estimating Time Required to Machine and Assemble Parts

Design

DIES of this type of construction are very popular because of their economy not only in original cost and maintenance but in operation as well. The die illustrated has two stations, one the pierce and cut-off; the other the complete form so that after the first blank a complete part is made at every stroke.

The die proper as mounted on the die shoe is of sectional construction composed of five parts, all tool steel hardened and ground. The end die block (14) contains the piercing opening and is part of the cut-off and the block (9) next to it is the other half of the cut-off as well as one of the form sections. As will be noted, the die opening is considerably larger than is necessary for the given width of stock to allow room enough for the heels of the cut-off punch (10). The spring pad (4) is used to hold the piece securely while forming and to take the finished part out of the form section. The form block (2) is made to surround the pad and has the necessary shape for the form of the part. The gage (1) is attached to the end of the form block as shown and is of such length to stop the material in the proper location to give the correct form heights.

The center block (9) is in the shape as shown to give it more strength. The position of the piercing is located by the relation of the die edge to the part, while the width of the cut-off opening, that is from cut edge to cut edge, is determined only by the thickness of the stock and may vary with different thicknesses. The distance from the cut edge nearest the form to the form edge is determined by the height of the form. The method of gaging and stock guidance may also vary; however, in this case gage pins (24) have been used. The entire sectional build up is mounted

to the die shoe permanently by means of screws and dowels with the exception of the spring pad (4) which is held in place by the form blocks and shoulder screws (5).

The upper half or punch sections of the die is mounted to the punch holder permanently with the exception of the spring stripper which is held in place by stripper or shoulder screws (17) and actuated by springs (18). The perforator (11) is retained in the pad (12) and the cut-off punch (10) is mounted directly on the surface of the pad, making a complete unit that in turn is mounted. Both the punch and perforator are shown entering the die to a depth greater than the form punch (3) so the stock will be free before forming takes place and to prevent the strip of material from jumping away from the cut-off punch.

The forming punch (3) is of one piece shaped to the proper size and contour and has a stripper pin (7) to prevent any possibility of the blank adhering to the face of the punch. The cut-off punch is of the heel type and has two extensions that enter the die opening spanning the stock and giving support before cutting takes place. The spring stripper (13) is used to strip the material from the perforator and cut-off punch.

The perforator, cut-off punch and form punch are made of tool steel, hardened and ground to suit. The retaining pad and stripper remain soft.

There are a great number of variations of construction in the parts composing the general build up of a die of this type. However, the basic principles will never change or vary and where the shape of parts permits sectional construction, careful consideration should be given to the use of this type of design.

Estimate

MACHINING AND GRINDING

Column A—for time values see Table, Fig. 6

	Machining hr.	Grinding hr.
END DIE BLOCK—Det. 14—1½" x 2" x 3½" TS	.6	.8
DIE BLOCK—Det. 9—1½" x 2½" x 3½" TS	.6	.8
FORM DIE BLOCK—Det. 2—1½" x 3½" x 3⅞" TS	.7	.9
SPRING PAD—Det. 4—¾" x 1½" x 3" TS	.5	.7
STOP GAGE—Det. 1—¾" x 1¼" x 1¾" TS (not hardened)	.3	.2
CUT-OFF PUNCH—Det. 10—1¼" x 2" x 3¾" TS	.5	.7
FORM PUNCH—Det. 3—2½" x 2½" x 4¼" TS	.7	.9
PUNCH PLATE (CUT-OFF STA. PAD)—Det. 12—¾" x 3½" x 3¾" CRS (70%)	.4	.3
STRIPPER—Det. 13—⅝" x 2" x 3¾" CRS (70%)	.4	.3
	4.7	5.6

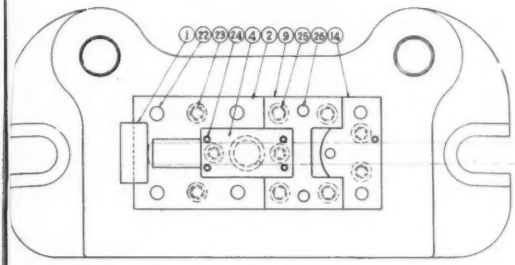
TOTAL Column A ..... 10.3 hrs.

DRILLING ALL HOLES EXCEPT FOR PERFORATORS AND PILOTS

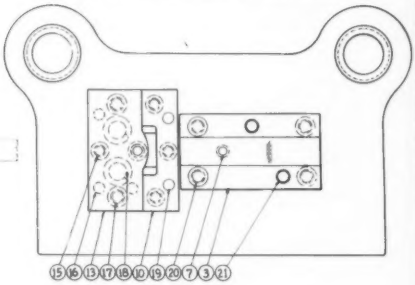
Column B—for time values see Table, Fig. 7 (Spring Hole Time Values, See Fig. 8)

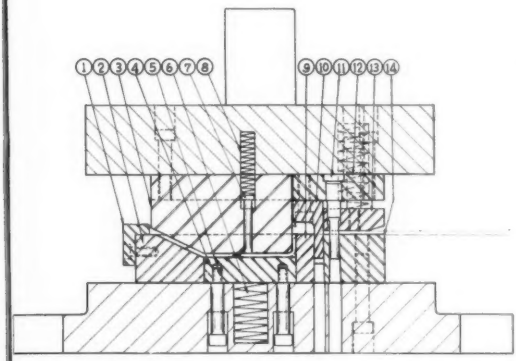
END DIE BLOCK—Det. 14—2 screws, 2 dowels	.5 hr.
DIE BLOCK—Det. 9—4 screws, 2 dowels	.7
FORM DIE BLOCK—Det. 2—2 screws, 4 dowels	.7
2 screws for stop	.3
SPRING PAD—Det. 4—2 screws	.3
STOP GAGE—Det. 1—2 screws	.3
CUT-OFF PUNCH—Det. 10—3 screws, 2 dowels	.6
FORM PUNCH—Det. 3—4 screws, 2 dowels	.7
PUNCH PLATE—Det. 12—7 screws, 4 dowels	1.2
STRIPPER—Det. 13—4 screws	.5
DIE SHOE—Total of 18 Holes	1.9
2 screws, 2 dowels for Det. 14	
4 screws, 2 dowels for Det. 9	
2 screws, 4 dowels for Det. 2	
2 screws for pad, Det. 4	
1 SPRING HOLE for pad, Det. 4	.5
PUNCH HOLDER—Total of 17 Holes	1.8
3 screws, 2 dowels for Punch Det. 10	
4 screws, 2 dowels for Punch Det. 3	

Plan View of Die

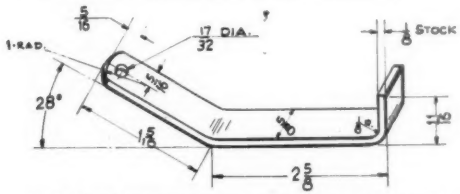


Plan View of Punch—Inverted





Section on Center Line of Die Assembly



This bracket was used to support a control rod. The rod went through the hole and the body of the bracket was welded in position.

MATERIAL LIST

Det.	Req.	SIZE & MATERIAL	Remarks
1	1	¾″ x 1¼″ x 1¾″ GAGE TS	Hdn. & Gr.
2	1	1½″ x 3½″ x 3⅞″ FORM BLOCK TS	" "
3	1	2½″ x 2½″ x 4¼″ FORM PUNCH TS	" "
4	1	¾″ x 1½″ x 3″ SPRING PAD TS	" "
5	2	¾″ x 1½″ STRIPPER BOLTS	
6	1	SPRING TO SUIT	
7	1	SPRING PIN	
8	1	SPRING TO SUIT	
9	1	1½″ x 2½″ x 3½″ DIE BLOCK	Hdn. & Gr.
10	1	1¼″ x 2″ x 3¾″ CUT-OFF PUNCH TS	" "
11	1	¾″ DIA. x 3″-6″ PERFORATOR D.R.	" "
12	1	¾″ x 3½″ x 3¾″ CUT-OFF STA. PAD CRS	
13	1	⅝″ x 2″ x 3¾″ SPRING STRIPPER CRS	
14	1	1½″ x 2″ x 3½″ END DIE BLOCK TS	Hdn. & Gr.
15	5	⅜″ x 1¾″ SOC. HD. SCR.	
16	3	⅝″ DIA. x 1½″ DOWELS	
17	2	⅝″ x 1¾″ STRIPPER BOLTS	
18	2	SPRINGS TO SUIT	
19	2	⅝″ DIA. x 1½″ DOWELS	
20	4	⅜″ x 1½″ SOC. HD. SCR.	
21	2	⅜″ DIA. x 2″ DOWELS	
22	4	⅜″ DIA. x 2½″ DOWELS	
23	2	⅜″ x 1½″ SOC. HD. SCR.	
24	5	⅝″ DIA. x ¾″ DOWELS	
25	4	⅜″ x 1¾″ SOC. HD. SCR.	
26	2	⅝″ DIA. x 2″ DOWELS	
27	2	¼″ x ½″ SOC. HD. SCR.	For detail No. 1.

Fig. 52. Progressive Pierce, Cut-Off and Form Die Designed by E. Taylor, Courtesy: Federal Tool Corp., Chicago.

---

4 screws, 2 dowels for Punch Plate, Det. 12 .....
2 SPRING HOLES FOR STRIPPER, Det. 13 ..... 1.0

TOTAL Column B .....11.0 hrs.

LAYOUT AND INSPECTION

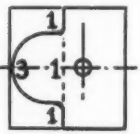
Column C—for contour time values see Tables, Figs. 9, 10, 11, 12

Layout

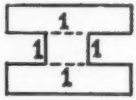
END DIE BLOCK—Det. 14—
2 units for perforators ..... .2 hr.
6 units 6

(Perforator shown at Right)

Det. 14

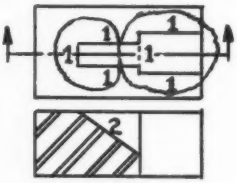


Det. 9



DIE BLOCK—Det. 9—
2 units each .....
4 units total 4

Det. 2



(Opening 1 is shown at Right, Opening 2, Left and Below)

FORM DIE BLOCK—Det. 2—
Opening 1—3 units 3
Opening 2—5 units 5
2.0 hrs.

Inspection

END DIE BLOCK—Det. 14—
(Allowance not made for perforator) ..... 1.1 hrs.
DIE BLOCK—Det. 9— 9
FORM DIE BLOCK—Det. 2 .. 1.3
3.3 hrs.

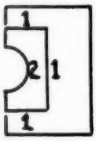
TOTAL Column C ..... 5.3 hrs.

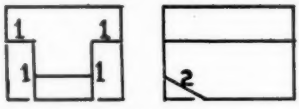
MACHINING, FINISHING AND FITTING DIE PARTS

Column D—use contour units as established for Column C, also Drawings and Tables, Figs. 13-20

Machining

END DIE BLOCK—Det. 14—
6 units, size 3½ sq. inches x 1½" deep ..... 5.6 hrs.
DIE BLOCK—Det. 9—(2) x 2 units, size 1½ sq. inches x 1½" deep 1.7
FORM DIE BLOCK—Det. 2—8 units, size 4½ sq. inches x 1½" deep (For Material Removal, see Table, Fig. 19) ... 6.8
STOP—Det. 1—2 units, size 1 sq. inch x ½" deep 3
CUT-OFF PUNCH—Det. 10—5 units, type 2, size 4", (Fig. 16) 4.8





(Det. 10 Top; Det. 3 Center; Det. 13 Bottom)

FORM PUNCH—Det. 3—
2 units, 6 sq. inches each by ¾" deep = 2 x 1.2 ..... 2.4
2 units, 1 sq. inch x 1" deep (Fig. 19) .4
STRIPPER—Det. 13—4 units, 1 sq. inch x ¾" deep (70% for CRS) 5

TOTAL Column D .....22.5 hrs.

PERFORATORS, PILOTS AND THEIR CORRESPONDING HOLES

Column E—see Table and Drawings, Figs. 21-26

PERFORATOR—Det. 11—Type 3 ..... 2.0 hrs.
Hole for same 9
GAGE PINS—6 required, including locating and mounting 3.0
OIL PIN 1.7

TOTAL Column E ..... 7.6 hrs.

(Continued on Page 62)

PLASTIC MOLD DESIGNING

By GORDON B. THAYER
Plastic Design Engineer
General Industries Company

Article IX of a Series

The double acting pneumatic stripper design described was used for the loose-bar injection mold which was the subject of the October article. This stripper design is simple, adaptable for many stripping or ejection operations in plastic molding, increases operator efficiency and permits maximum production possible in a given operation.

By the substitution of a different stripper jaw bar, the same cylinder may be used for stripping other parts.

The Editor.

A Pneumatic Stripping Device for an Injection Mold

A LOOSE-BAR injection type mold for a sliding box cover having thin walls and long-draw characteristics has already been described in a preceding chapter. This mold was designed with two sets of bar and core assemblies so that the castings could be stripped from one set while the other set was in the molding press. However, no provision was shown for stripping the molded pieces from the cores. This operation may be done in easy cases by tapping the casting with a rawhide hammer or with wood blocks. Such a method is rather crude, but might be suitable if the castings do not stick too tightly. There is danger of damaging the castings too, and this is a primary consideration in stripper design. A simple mechanical, hand-operated lever arrangement is another method which may be used. However, a pneumatic stripping device was chosen for this mold, as it suggests a range of possibilities for the use of the air cylinder in the plastic molding department.

The use of pneumatically operated mechanisms in production work offers several advantages. Hand operated fixtures are limited by the force an operator can exert. This does not mean the total effort he can make once, but what he can do efficiently many times in a day without tiring unduly. An air cylinder may be made large enough in area to obtain the required force, which may be greater than a man can conveniently supply. The action may be adjusted to the speed desired, and can be kept constant and in the required direction. Another advantage may be obtained by using a foot operated valve, thus leaving the operator's hands free for some other operation, thus increasing production

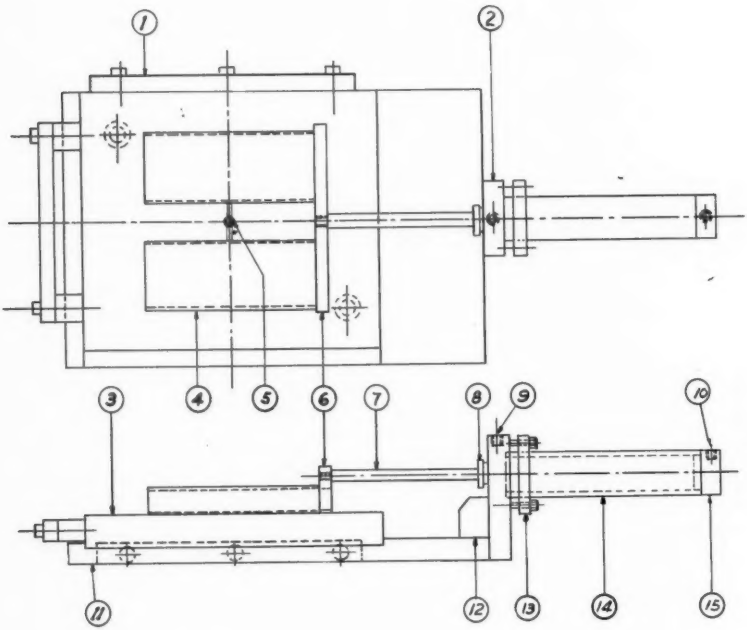


Fig. 16. A double acting pneumatic stripper. This was designed for use with the loose-bar mold shown in Fig. 15.

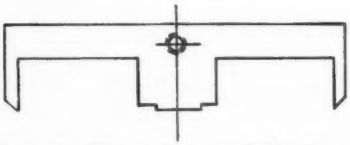


Fig. 17. The end view of the brass stripper jaw bar.

possibilities.

The pneumatic stripper shown in Fig. 16 is double acting. That is, stripping is accomplished by the stroke in either direction, and no air is wasted either on a return stroke or by a necessarily larger area to provide the force to overcome a return spring. The loose bar was designed to have the runners lie flat on the face, so they may be pushed off with the castings, and later clipped at the gate. In operation, the core and bar assembly is placed in the nest provided in the fixture and the stripper jaws then engage the castings and push or pull them off the cores.

The stripping fixture consists of a base, mounting bracket, cylinder, and

(Continued on Page 56)

Principal Parts

1. Gage bar
2. Mounting bracket
3. Loose bar in place
4. Casting
5. Spur and runners
6. Stripper bar jaw
7. Piston rod
8. Packing gland
9. Pipe tap for air inlet and outlet
10. Pipe tap
11. Base plate
12. Brace
13. Flange
14. Cylinder
15. Plug

The Design and Construction of Typical Drill Jigs

By E. G. Marshall

Assistant Superintendent
Pittsburgh Screw and Bolt Corp.
Prebble Avenue Plant

Part Two

Continuing the Marshall series of Practical Tool Design and Tool Making we present the second of the drill jig articles. A standard jig casting, a box type drill jig, a combination jig and a trunnion jig are described. These representative jigs have been selected to illustrate a range of work commonly done in the tool room and die shop.

This material has been especially prepared for apprentices and young shop men who are preparing themselves for the next better job in their shop or department.

The Editor

FIGURE 17 illustrates the use of a standard casting A that can be adapted to many different jobs. The castings can be machined in dozen lots and held in the crib until needed. The jobs of small size that can be done by proper design in these castings are almost limitless.

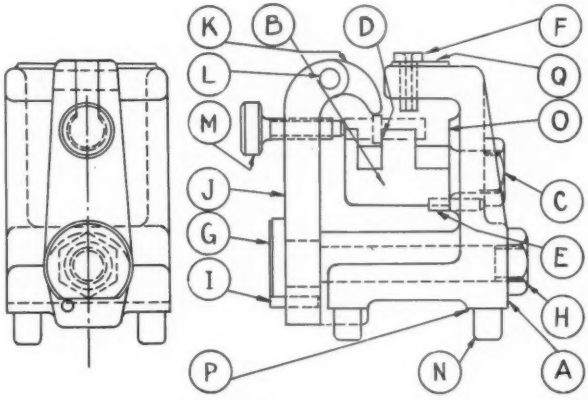


Fig. 17

A is the main jig body, a gray iron casting. B is the "V"-block used to locate the work. The "V" holds the work parallel with the base and the shoulder D locates the shoulder of the work so it cannot move endways. The "V" is clamped to the casting by the nut C, and held in position by the dowel pin E. The block B is made of tool steel and hardened, and the "V" is ground to be in line with the round section in the casting and square with the finished face of the

casting. A hole is bored in the top of the casting for the drill bushing F. The shoulder stud G is used as a pivot stud for the swinging clamp. The length of the shoulder allows the clamp to swing freely when the stud is clamped securely with the nut H. The dowel I is used to limit the swing of the clamp. The clamp J which holds the work can be made of cold rolled steel. The top is slotted to receive the compensating clamp which holds the work down in the "V" and endways at the same time. This clamp pivots on the pin L in the main clamp. The pressure is made to bear on the work by the screw M. The clamp K can be made of cold rolled steel, cyanide hardened or of tool steel. The screw M also should be hardened. N, the feet of the jig, are cold rolled steel, cyanide hardened.

the screw D against the locating block E. The two locating blocks are made of tool steel and are hardened and ground. They are screwed and doweled to the main body of the jig. The lid is used to give an opening to load the jig and to hold the clamp screws. The lid G is pivoted on the pins H and held in the closed position by the lid screw I. The bushings J are used to drill the holes in the end where the work attaches to the motor. The bushings K are used to drill the holes in the feet of the work. M is a liner bushing on each end of the worm bearings. The bushing L represents a series of removable bushings to rough drill, ream and line ream. The hole is drilled from each end $\frac{1}{32}$" smaller than the finished size. The bushing is changed and the hole is machine reamed from each end to .005" undersize. A line

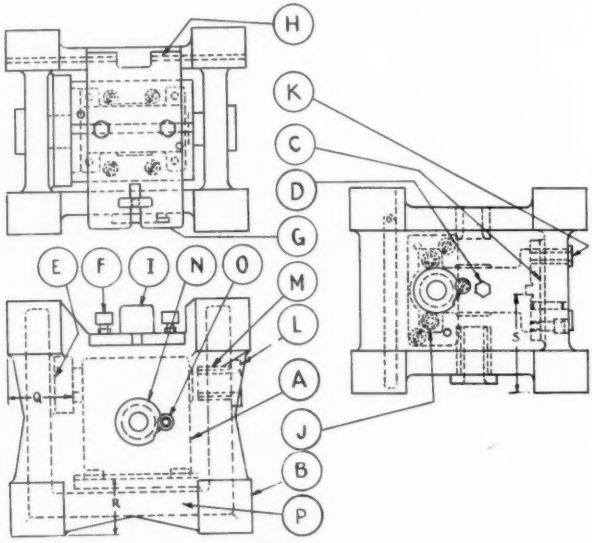


Fig. 18

Fig. 18 is a drawing of a box type drill jig. The work to be drilled is a gear reduction case for an electric-operated grease gun shown at A. B is the main body of the jig. It is made of cast iron, and is a rather complicated casting. The work is placed flat on the locating plate C, held by screws F. The key in the plate locates the work sideways. The work is located endways by

reamer is then used with a bushing in one end to fit the pilot and a bushing in the other end to fit the reamer and full sized pilot following the reamer. The pilot on the starting end of the reamer must be long enough to be entered in the bottom bushing before the reamer starts cutting and the guide following the reamer must be long enough to guide until the reamer is through cut-

ting on both bearings.

The same is true of the cross hole worm gear bearings. The bushing in the bottom of the cross hole is not changed. The top bushing is changed to drill, ream and line ream and the bottom bushing is used as a pilot reamer guide. The removable bushings are locked in position by the shoulder screw O.

the ram is a standard size, 2½". As the pin is a snug, sliding fit in the ram hole, it backs up the drill and reamer when drilling a half hole in the ram.

A stop collar was used on the reamer so that each hole would be the same size. The plate A-2 and the block A-1 were screwed and doweled together.

The bushings were made with .025"

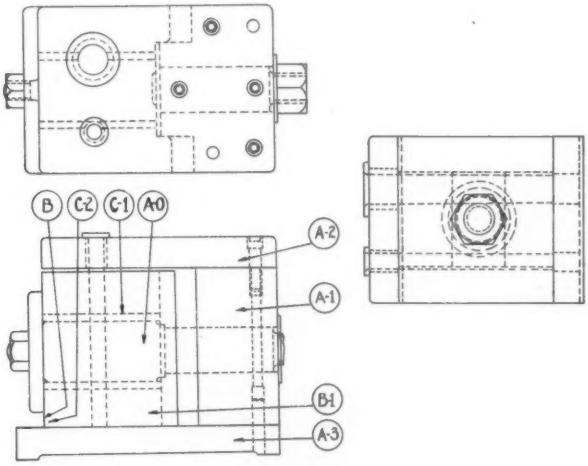


Fig. 19

Fig. 19 is a drawing of a combination drill jig used to drill different parts before hardening so they will fit together after hardening and grinding. The equipment used to pierce the eye in hammers, hatchets, and axes is a forging machine called an upsetter. The punches that pierce the work are held in adaptors, which in turn fit in holes in the ram. These holes are fitted with hardened and ground bushings to resist wear. So that these parts could be made interchangeable, the jig shown in Fig. 19 was designed. It was used to ream the dowel hole in the ram and the tool steel bushings. It was also used to taper ream the pin hole for the clamping pin in the ram, the bushing and the adaptor.

The parts marked A were used to drill the ram. The pin A-0 fits into the hole in the ram; the block A-1 fits into the recess in the face of the ram; and the top plate fits over the top surface of the ram. The diameter of the hole in stock to be ground off after hardening. The allowance was both on the inside and the outside. When the bushing was soft enough to drill, it was oversize on the outside and undersize in the hole. Another pin A-0, similar to the one previously described, but a different diameter, was used in drilling the bushing. The block B-1 was ground internally to fit the oversize bushing and with the pin was used to drill the soft bushing. They were used with A-1 and A-2. Both block B-1 and pin were used to guide the drill and reamer. The adaptors were drilled by using the block C-2 and the bushing C-1.

A Trunnion Jig

Fig. 20 is a drawing of a drill jig, called a trunnion jig because of its bearing suspension. It is made to drill the steering knuckle lever for an automobile. Volume production demanded a design that would stand up, yet which would

permit quick and easy operation. In such a jig the original cost is not the major consideration. In the automobile shops the high production makes it imperative that the utmost reliability be built into all tools, jigs and fixtures.

pivots in bearings in the two end plates.

The bearing A on casting (2) works in a bronze bushing (4), pressed in the end plates. The bushing is easily replaceable, and bearing bronze and cast iron make a long-lived bearing when

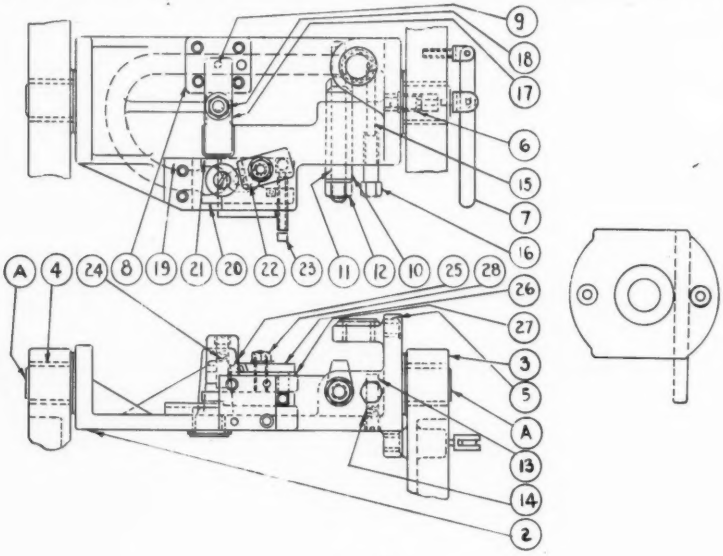


Fig. 20

The job shown in Fig. 20 was done in a two spindle drill press, with the spindles adjusted to line up with the bushings in the drill jig when they were rotated to come under the spindles. As this allowed the jig to be clamped permanently to the drill press table, it was unnecessary for the operator to move the jig around to line up the spindle and the jig.

Liner and removable bushings (not shown in the drawing) were used. The first operation was to drill the small diameter of the hole all the way through, using a removable bushing to fit the drill. The second operation was to taper ream to size with a special taper reamer. The special taper reamer was also guided in a removable bushing. Another removable bushing guided the spotface cutter, the third operation. Due to the lack of space in the drawing, the base of the jig bolted on the drill press table by the end plates (3) is not shown. The casting (2) to which the work is clamped properly lubricated.

The indexing and positioning of the jig casting (2) is done by the bushings (5) pressed into it 180 degrees apart. A plunger (6) in the end casting fits into the bushings and locks the casting. The plunger is manually operated by the hand lever (7) also attached to the end casting.

Before this drilling operation the work surface to be attached to the car axle was machined. This machined surface locates in a slot in plate (8). The work is located laterally and vertically by this plate. The work is located endways by a dowel pin (9) in a drilled hole in the work. The dowel is a drive fit in the plate, which is screwed and doweled to the casting. The flat clamp (17) and the screw and nut (18) clamp the work on the plate.

The tie rod end of the work is held from moving laterally during drilling by the clamps (10 and 11). Number 10 is

(Continued on Page 30)

Lakeside Opens New Plant

The Lakeside Steel Improvement Co., of Cleveland, Ohio, have opened their new addition, especially designed and built to house their bar straightening and flame hardening departments and to provide additional office space. In the new building Lakeside has installed some of the largest bar straightening equipment available to industry. The new enlarged departments are already in operation, greatly increasing the facilities of this well-known heat treater. The company is also redesigning and modernizing equipment in the old plant where nitriding, chapmanizing, aerocasing, carburizing and cyaniding, annealing, stress relieving and hardening of tool and high speed steels is done. The Lakeside Company specializes in flame hardening, having developed among others a method of vertical spinning for fast, uniform hardening with minimum distortion. This Company also has been very successful in flame hardening tool and die steels.

National Defense Program Increases Demand for Gages

Individual gage manufacturers report 1940 sales ranging from 100 to 600 per cent over 1939 sales. Perhaps the most important reason for this gain is the fact that many companies that are engaged in the production of munitions and war materials must meet Government specifications. Many firms whose previous work did not require close gaging are now finding it necessary to use precision inspection tools. Further, in making such parts as airplane parts, gages are used for checking and inspection at successive stages of manufacture. This is generally true of munitions work.

Many of the small shops now coming into the National Defense program as subcontractors are among the most active gage purchasers, according to reports. Many gage manufacturers are now operating at capacity, and some types of gages—particularly ring, plug and thread gages—are not immediately obtainable. As a result, many gage users are specifying chrome plated or cemented carbide types of gages because of their longer life and long term economy. This, together with the fact that several gage manufacturers are expanding their production, has somewhat relieved the demand for precision and inspection gages.

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Design of Drill Jigs

(Continued from Page 28)

a drive fit in the casting, and Number 11 slides inside Number 10 and clamps the work when the nut (12) is tightened. This end of the work is supported against the thrust of the drill by plunger (13), which is held lightly against the work by the spring (14). After the work has been securely clamped, the plunger is locked by tightening the screw (16), which moves the hardened pin (15) against the plunger.

The other end, or drag link end, of the work is roughly located by the plate (19). This plate is also screwed and doweled to the casting. The work is held from moving laterally by the clamp jaws (20 and 21). The jaws are held in the jig by the pin (22). They are permitted to swing laterally to suit the location of the work. Also, they can be moved away from the work as shown by the slot in the jaws. The jaws are tightened on the work by the set screw (23). It is threaded in one jaw and the point works against the heel of the other jaw. The pin (27) locks these jaws.

The drag link end of the work is supported during drilling by the plunger (24). The spring above the plunger holds it lightly against the work. The pin (25) moving endways locks the plunger in position. This movement of the pin is obtained by the angular end of the clamp (26) moving downward. The front end of the clamp works against the pin (25) and the back end on top the pin (27). When the nut (28) is tightened, the plunger is locked and the clamps (20 and 21) are in their working position.

Allegheny Ludlum Steel Corp. Makes Appointments

Mr. C. A. Peck, who has been in the tool steel business for the past several years, has joined the tool steel department of the Chicago office of the Allegheny Ludlum Steel Corporation. The company also announces the appointment of H. J. Barton to their tool steel division in the southern California territory. Mr. Barton has been associated with tool steel activities on the Pacific Coast for many years, specializing in the sale of tool, alloy and special steels.

How do CERRO ALLOYS cut costs?

- - Fill out, tear out, find out

☐ CERROMATRIX. Please send me information on this low-temperature-melting alloy that expands slightly on solidifying. I understand it is used for securing punch and die parts, anchoring machine parts without the expense of a drive fit, engraving machine models, stripper plates, chucks, etc.

☐ CERROBEND. I would like to know about this alloy, which is used for a filler in bending thin-walled tubes to small radii and for other purposes.

☐ CERROBASE. Send literature on this metal, which I understand is used for reproduction of master patterns, models for electroforming, engraving machine models, seal for nitriding and annealing furnaces, proof casting for forging dies, etc.

NAME_____ TITLE_____

COMPANY_____

STREET_____

CITY_____ STATE_____

CERRO DE PASCO COPPER CORPORATION

40 Wall Street -:- New York, N. Y.

British Associates: Mining & Chemical Products Ltd., London

Canadian Distributors: Dominion Merchants Ltd., Montreal

When you order or write about products described in TDM PROGRESS please mention the publication.

"It's the Principle of the Thing"; Blanchard's Work Book

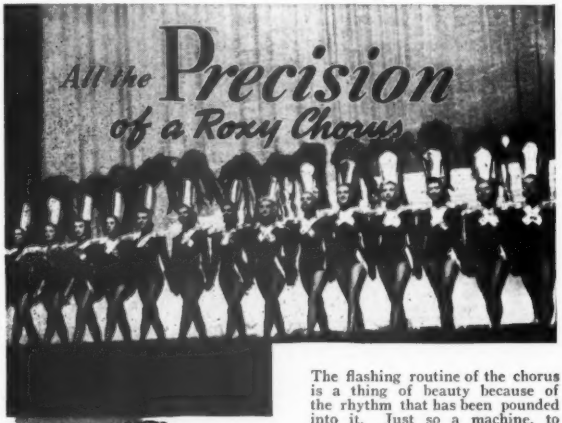
THE record of Blanchard Surface Grinder accuracy and profit-earning capacity for a period of over 30 years has been based on the principle employed to insure an accurate flat surface. Work, carried on the Blanchard rotary magnetic chuck, is ground with the end of a cylinder or segment wheel. As the chuck and wheel rotate in opposite directions, the two sets of curved grinding marks, crossing each other over all the surface, serve as a check on the flatness. The correct parallel alignment of the axis of wheel and work is easily maintained with the Blanchard Three-Point Column Support. The heavy box section column is rigidly but adjustably secured to the base at three points, widely spread apart. This makes it an easy matter to bring the spindle square with the chuck, regardless of wear in the bearings and slide.

"Work Done on the Blanchard" is a booklet presenting typical examples of the machining and finishing of flat surfaces by Blanchard Surface Grinders. Liberally illustrated and with data including material, stock to be removed, limits and production in pieces and surfaces per hour for a wide variety of jobs on each grinder in the line, the booklet is well indexed to include wheels recommended for each job.

A copy of the leaflet or booklet will be sent on request. Write the Blanchard Machine Co., 64 State St., Cambridge, Mass.

Carboloy Opens Western Office

Because of the recent important industrial development on the West Coast, Carboloy Company, Inc., is opening a branch office at 5905 Pacific Blvd., Huntington Park, Los Angeles. A complete stock of standard Carboloy tools and standard blanks will be carried. The new office will have a grinding demonstration room in which all types of Carboloy grinders will be set up for ready demonstration of tool room grinding technique. Mr. J. W. Doody, West Coast representative for the Carboloy Company for the past ten years, and Mr. Ray D. Mack, Carboloy's former Service Engineer in Wisconsin, will be in charge of the new office.



Dumore No. 5 "Master" Precision Grinder

The flashing routine of the chorus is a thing of beauty because of the rhythm that has been pounded into it. Just so a machine, to be accurate, must have accuracy *built* into it. In machine shops and tool rooms where exactness is essential . . . where the finest precision work is done . . . you will find Dumore Precision Grinders on the job. Yes, and grinding to tolerances of a tenth (.0001") . . . Yet there are no more rugged grinders made. Ask your Industrial Distributor for a demonstration of these time-saving, cost-cutting tools. Or write for the latest catalog.

ONLY DUMORE GIVES YOU ALL OF THESE

- Lightweight for easy portability.
- 42,500 r.p.m. . . . . without vibration.
- Wide selection of quick-change quills.
- 15 models from which to select.
- 25 years precision manufacturing experience.
- Top-ranking distributors conveniently located.

Dumore PRECISION Grinders

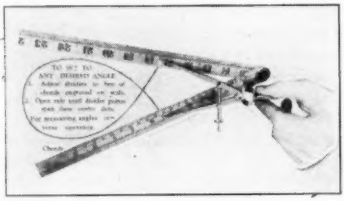
THE DUMORE CO., Dept. 370-L RACINE, WIS.

New Chesterman Jointed Stainless Steel Rule Also Serves as a Protractor

THE new Chesterman Jointed Stainless Steel Rule, a patented tool for easy layout work, is of particular interest to toolmakers. The two 12" arms, provided with a spring tension joint of sufficient friction to hold the angle setting rigid for scribing and layout work, has graduations to $\frac{1}{16}$" on the outside edges. One inner edge is engraved with an accurate trigonometric function scale of chords from 0° to 120°, advancing by half degrees. This permits the rule to serve as a protractor. A center dot is marked on each arm. With the aid of a pair of dividers, the rule can be set to any desired angle, with no calculations whatever required.

The dividers are adjusted to the line of chords engraved on the scale. Then the rule is opened until the divider points span these center dots. Any angle may be determined by reversing the operation.

The new Chesterman Jointed Stainless Steel Rule will be sent to responsible shopmen on a 10 days' free trial.



For new circular giving instructions for use of Jointed Stainless Steel Rule, write George Scherr Co., 128-B Lafayette St., New York, N. Y.

Contract Shop Directory Listings

The Contract Shop Directory published on pages 44-49 of the October issue was based on information sent on an Institute survey form and made no claim to complete coverage. Additional listing will be published in later issues.

TRU-ROUND SHOULDER

SCREWS • DOWEL PINS

ALLEN accuracy

holds your work

true to close-tolerance limits

Diemakers find in Allen Hollow Screws the qualities indispensable to accurate locating of work and retention of assemblies.

The Socket Head Cap Screws and Shoulder Screws (Stripper Bolts) are *"pressur-formd"* to preserve *continuous* steel-fibres shaped to the contour of the screw head, increasing strength for tight set-ups. The Allen *"duo-process"* threading makes the axial fibres of the steel conform to the contours of the thread profile, — structurally reinforces thread-accuracy that evenly distributes friction-pressure over the entire length of the thread.

The Dowel Pins (like the Hollow Screws) are made of special *Allenoy* steel, ground to exceedingly close tolerance limits, with tensile strength of 240,000 to 250,000 lbs. per square inch.

Ask for descriptive folder G-21

THE ALLEN MANUFACTURING COMPANY
Hartford, Connecticut, U. S. A.

When you order or write about products described in TDM PROGRESS please mention the publication.

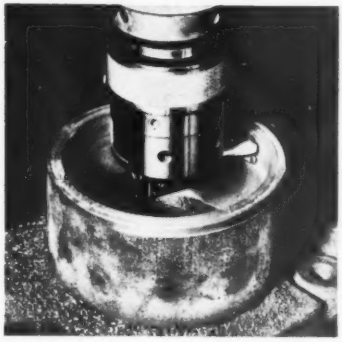
THE PRECISION UNIVERSAL TOOL HEAD

THE ONLY TOOL HEAD THAT IS ADJUSTABLE WITHOUT STOPPING THE MACHINE.

A truly Universal Tool Head that has rendered all types of the once popular wrench-adjusted "offset" or "eccentric" boring tool entirely obsolete, as it brings all adjustments under absolute micrometric control of the operator at all times and at all speeds without stopping tool or machine.

By a mere turn of the wrist the cutting tool is instantly adjusted to a fraction of a thousandth for boring, or fed continuously across or into the work for facing or recessing.

It is not only the fastest and most accurate boring tool in existence, but is far more than that, as it also faces, counterbores, turns outside diameters of hubs and bosses, recesses, mills flat surfaces and slots, undercuts, back-faces, trepans and does countless "headache" jobs that wrench-adjusted boring tools cannot do because they cannot be adjusted while running.



HOW WOULD YOU DO THESE JOBS?

Illustrations show portions of a large experimental casting (4 x 5 feet) having nine hubs and bosses to be bored, faced, counterbored, chamfered, outside diameters turned, grooves cut inside and out, outside shoulders faced, undercut, etc. Accuracy and quick delivery were vital. Finished complete at one setting with Precision Universal Tool Head. Time and cost less than one-third of that required if wrench-adjusted plain boring heads had been used and makeshifts "rigged up" for turning, facing, etc.

Standard equipment on all leading Jig Boring Machines.

Let us send you bulletins and additional information.

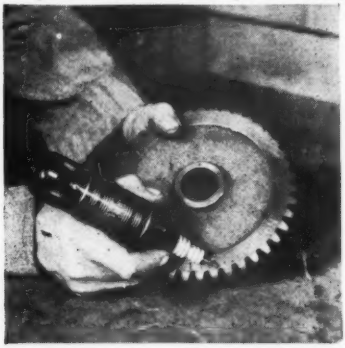
THE PRECISION TOOL COMPANY
P. O. BOX 115, BROOKLYN, NEW YORK
Cable Addres: PRETOOL-NEWYORK Telephone: MAin 4-1064

When you order or write about products described in TDM PROGRESS please mention the publication.

"Chicago" Announces New Engraving and Marking Set

A PRACTICAL tool room use for the DeLuxe Handee Engraving and Marking Set is to mark piece part, serial or order numbers on tools, dies, jigs, fixtures or, as illustrated, on a gear.

The new DeLuxe Handee, equipped with especially designed accessories, is ideal for marking and re-marking hardened steel, glass bottles, lead coated stock, painted surfaces. The unit is so light in weight, twelve ounces, that it can be easily transported to the work. It plugs in any electric light outlet. Indelible characters can be written as quickly as with fountain pen or pencil.



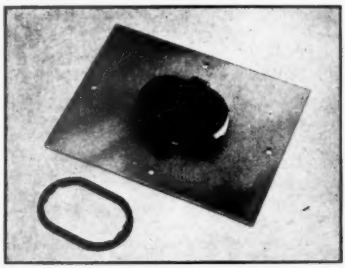
The unit is low in cost and thoroughly reliable.

The DeLuxe Handee itself is shaped to fit the hand—all moving parts, except the accessory being used, are completely enclosed for accurate, precision work. The tool room and die shop will find many uses for this versatile tool.

Literature on the DeLuxe Handee Engraving and Marking Set will be sent promptly on request. Write Chicago Wheel & Mfg. Co. Dept. BZ, 1101 W. Monroe St., Chicago, Ill.

Bates Adds Hand Forged, High Speed Rotary Punches

H. O. BATES, designer and builder of Acromark marking devices, numbering machines and other devices for imprinting or stamping, recently announced a line of Hand Forged Press Punches and a new High Speed Rotary Punch. The hand forged press punches, designed to supplant Steel Rule Dies, are detachable for sharpening, but so substantially constructed that they stand up even on the most difficult materials. Hand forged to any practical shape from a wear resistant tool steel and hardened,

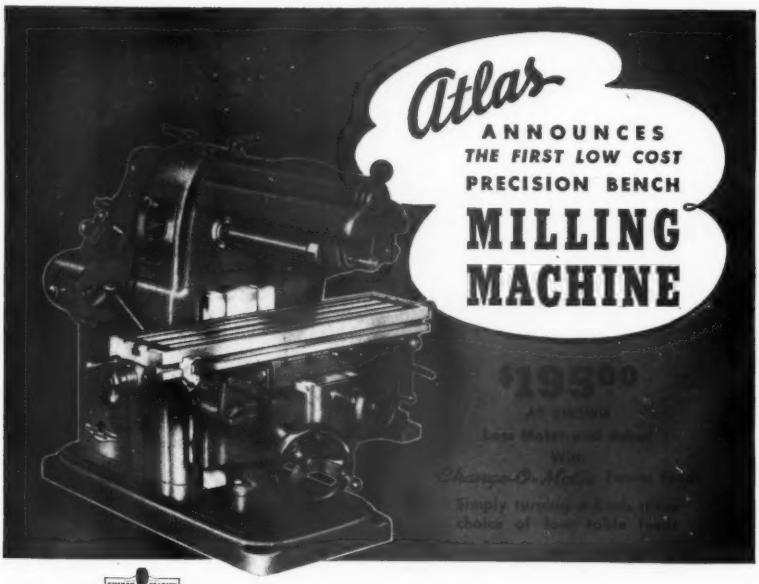


the press punches are mounted on a steel backing plate for use in a foot or power press. Designed for precision work on variable production the hand forged press punches are suited also to high production work.

The High Speed Rotary Punch is designed to cut accurate holes in resilient rubber and other pliable materials. Experiments proved that by tapering the cutting edge in a certain manner, it was possible to cut accurate and clean holes even in resilient rubber with ease. The High Speed Rotary Punch is a solution to troublesome hole punching in elastic or pliable materials.

At the same time, the Bates company announced several round Hand Forged Punches (eight sizes from ½" to 2") and seven sizes of "Raw-Hi" Rawhide Mallets.

For complete information on Hand Forged Press Punches or High Speed Rotary Punch write H. O. Bates, 261 North Broad St., Elizabeth, N. J.



TIMKEN BEARINGS SUPPORT

CONDENSED SPECIFICATIONS

TABLE

Working Surface.... .....4½" x 18"
Longitudinal Travel Hand ..... 12"
With "Change-O-Matic" ..... 10"
Feed Range with "Change-O-Matic" .162" to 9.125 per minute
Cross Travel.....3½"
Vertical Travel..... 6"

SPINDLE AND ARBOR
Timken Tapered Roller Bearings
12 Speeds, 54 to 3225 RPM
Spindle Taper..... .....No. 2 Morse
Hole through spindle .....17/32"
Arbor Diameter..... ½"
Overarm Diameter..1½"

Overall Dimensions 25½" x 32½" x 22" high
Base .....20½" x 18½"
Motor Recommended .....½ HP 1740 RPM
Weight less motor, with "Change-O-Matic" Feed....200 lbs.
Price less Motor, Standard Screw Feed $175.00
Price less Motor, Lever (Rapid) Feed...$180.00
Price less Motor, "Change-O-Matic" Power Feed as shown, less arbor $195.00

On paper for years—in tooling for the past two years—we've now completed development of this new Atlas Milling Machine to help meet the urgent machine tool needs of the nation.

It's a remarkable miller—ruggedly built, accurate, efficient—just the machine to cut costs on all types of small milling jobs in tool room or shop. Low in initial cost, low in set-up time, and low in operating costs (operates from 1/3 HP motor).

Three types of table controls are available: standard screw feed, rapid-production lever feed, and the new Atlas "Change-O-Matic" for instant selection of automatic table feeds between .162" and 9.125" per minute.

Timken tapered roller bearings carry spindle loads with a minimum of friction. An unusually wide range of spindle speeds provides correct surface speeds for all types of work and cutters. Swivel vise, rotary table, indexing centers, and safety belt guards are available.

Ask your machine tool dealer today for complete information about this new milling machine and send for your copy of the 1941 Atlas Catalog.

▲

ATLAS PRESS COMPANY

1112 N. PITCHER ST. KALAMAZOO, MICHIGAN

NEW YORK 130 W. 42nd St. | CHICAGO 35 E. Wacker St. at Wabash | PHILADELPHIA 113 N. Third St.

Atlas QUALITY SHOP EQUIPMENT SINCE 1911

When you order or write about products described in TDM PROGRESS please mention the publication.

New South Bend Tool Room Lathe Has Telescopic Taper Attachment

A NEW Series "S" Tool Room Lathe announced by the South Bend Lathe Works, South Bend, Indiana, has a number of features which save time on tool room operations. This 16-inch swing Underneath Belt Motor Driven Precision Lathe is made in 6', 7' and 8' bed lengths, having distance between centers of 34", 46" and 58". The headstock has 1⅜" capacity through the spindle and takes collets up to 1" capacity.

The design of this new lathe makes it especially adapted to fine tool and die work. A convenient arrangement of controls saves time and effort, reducing operator fatigue and assuring maximum production. Large diameter hand wheels facilitate precision adjustments on close tolerance work. Adjustable micrometer collars on the cross feed screw and the compound rest screw are large in diameter with clear-cut, easy to read graduations.

The telescopic taper attachment is permanently attached to the lathe carriage and is always ready for use, regardless of the position of the carriage. This feature saves much time in machining clearance tapers on punches and dies. To engage the taper attachment, it is only necessary to tighten two binding screws. The telescopic cross feed screw eliminates the necessity of disconnecting the cross feed nut when the taper attachment is to be used. The cross feed screw may be used to adjust the turning tool for the required diameter, and the taper attachment may then be engaged. To change back to straight turning, it is only necessary to loosen the two binding screws.

Tool Room Attachments supplied with the lathe include hand wheel type draw-in collet chuck, telescopic taper attachment, micrometer carriage stop, thread dial indicator, and chip pan. An electric grinding attachment, milling attachment and other attachments, chucks and accessories are supplied to order.

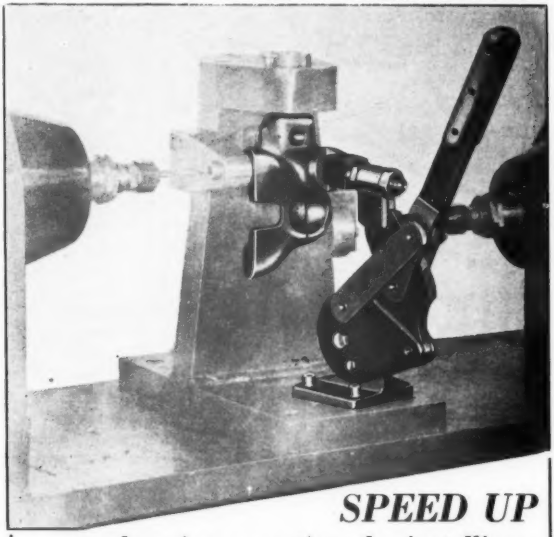
The fully enclosed underneath motor drive provides eight spindle speeds ranging from 21 to 725 R.P.M. Smooth vibration-free operation at high spindle speeds is achieved by using a direct belt drive to the carefully balanced cone pulley and spindle assembly. The motor and driving mechanism are mounted in the cabinet leg under the headstock, and the cone pulley belt passes up through the bed to the headstock. Back gears provide slow spindle speeds and ample power for machining large diameters. A convenient belt tension release lever and wrenchless bull gear lock permit rapid changing of spindle speeds.

A full quick change gear mechanism provides a series of 48 power longitudinal carriage feeds .0015" to .0841", a series of 48 power cross feeds .0006" to .0312", and a series of 48 right and left hand screw threads from 4 to 224 per inch. A drum type reversing switch and an instant reversing motor permit reversing the lathe spindle quickly, a great convenience on thread cutting jobs.

The bearings for the headstock spindle are unusually large, being of the integral type, and provide extreme rigidity, which reduces the possibility of chatter. The spindle is made of a special grade of alloy steel, with all bearing surfaces, including the tapered hole, carburized, hardened and precision ground. The journal bearing surfaces of the spindle are superfinished to a smoothness of 5 micro-inches. The lathe bed is a heavy semi-steel casting with three large V-ways and one flat way. The carriage is heavily constructed, with long bearing surfaces on the bed ways.

The apron is a double wall one-piece type, providing rigid support for both ends of all gear shafts. Power carriage feeds are operated by a worm drive and a series of steel gears in the apron which run in a bath of oil. The power feeds are controlled by a multiple disc friction clutch which may be engaged or disengaged instantly. This clutch is so constructed that it will not stick or slip under heavy cuts.

The New 16" Series "S" Tool Room Lathe is fully illustrated and described in Bulletin 16-T, a copy of which will be sent on request. Address South Bend Lathe Works, 196 E. Madison St., South Bend, Ind.



SPEED UP

your clamping operations by installing

KNU-KAM-KLAMPS

on drill jigs, milling and welding fixtures. These new tools combine the fast action and low cost of the standard toggle clamp with the tremendous holding power of the cam movement.

KNU-VISE INCORPORATED

16841 Hamilton Avenue

HIGHLAND PARK MICHIGAN

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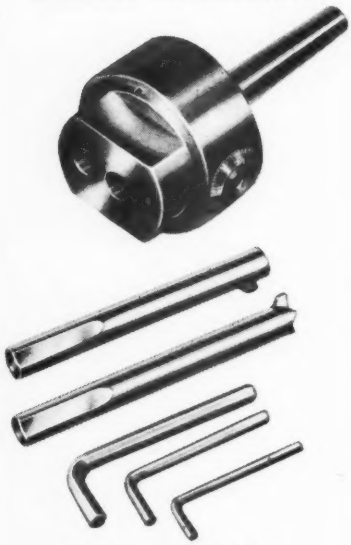
FRAY
MICROMETER
OFFSET BORING HEADS
Eliminate the Guesswork

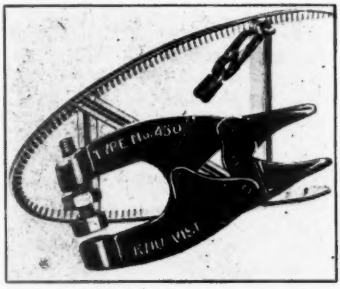


Write for Booklet

FRAY
MACHINE TOOL CO.
Makers of
"ALL ANGLE"
MILLING MACHINES
and
MILLING ATTACHMENTS
GLENDALE, CALIFORNIA
U. S. A.

Knu-Vise Introduces Midget Toggle Plier

A NEW midget toggle plier, designed and developed especially for the aircraft industry, is announced by Knu-Vise, Incorporated, manufacturers of toggle action clamping fixtures. The overall length is a mere three inches, the weight three ounces, and it is made from 1020 S.A.E. steel, hardened and tempered. Even with its small size, the leverage obtained by pressing the two handles between fore-finger and thumb is in excess of 90 to 1, thus enabling the operator to grip small aircraft or other parts with a pressure far in excess of that obtained with the conventional "CEE" clamp of small size.



Some of the first uses in the aircraft industry have been the clamping of formed sections to the skins and templates to sheets of aluminum when marking out. The shops that do sub-assembly of various small parts will find the Knu-Vise midget toggle plier of particular value.

For specifications, prices and other information on Midget Toggle Plier, write Knu-Vise, Incorporated, 16841 Hamilton Ave., Highland Park, Mich.

New Welding Positioner for Jigs and Fixtures

A new welding positioner capable of handling pieces up to 2,500 lbs., designed to facilitate the handling of jigs and fixtures and large machine parts while welding, is announced by the Ransome Concrete Machinery Co., Dunellen, N. J. The table top has T-slots for easy clamping and revolves a full 360° and tilts 135° beyond horizontal. A worm and worm wheel arrangement makes the

(Continued on Next Page)

When you order or write about products described in TDM PROGRESS please mention the publication.

(Continued from Page 38)

table self-locking when handling unbalanced loads. The machine is available with hand wheels for manual operation or with tilting and revolving motors with remote control push buttons.

A bulletin illustrating and describing the new machine will be sent upon request to the Ransome Concrete Machinery Company, Dept. TD-172, Dunellen, New Jersey.

DoAll Expands Production

The DoAll Saw Company of Des Plaines, Ill., division of the Continental Machines, Inc., of Minneapolis, Minn., has stepped up their production with their occupation of a new addition to their plant, doubling the manufacturing space to more than 15,000 square feet. The most modern special automatic saw making machines have been installed for manufacturing strong narrow bandsaws, tough enough to cut through as much as 12″ of any metal. While the saws are designed particularly for use in the DoAll contour machines, they can be used on other machines designed to use narrow bandsaws.

The Company announces that the convenient "Stripit" cartons formerly made of cardboard will hereafter be made of metal. The "Stripit" cartons have an opening in one side of the top, permitting the coiled saw to be pulled out to the length to be used and snipped off. One hundred feet of saw is contained in each box. An identification label and a "window" which gives the shopman a visual inventory of his saw stock, make the new metal cartons very easy to stack for storage.

Manufacturers' Representatives Open Cleveland Office

The new firm of Rein and Webster, Inc., have established offices at 1412 Keith Bldg., Cleveland, Ohio. This organization will represent firms manufacturing complete lines of die castings, plastics, rubber moldings, stampings and screw machine products. The president of the new company is Frank H. Webster; secretary and treasurer, John A. Rein.

Companies represented include the Latrobe Die Casting Company, Latrobe, Pa.; Zenith Plastics, Inc., Cleveland, O.; Ackerman Plastic Molding Company, Cleveland, O.; Metal Specialties, Inc., Cincinnati, O.; and Delco Screw Products Co., Delaware, O.

SPEED UP NATIONAL DEFENSE

with KENNAMETAL steel-cutting carbide tools

Scores of plants producing airplane parts, tanks, guns, shells and other armaments are now speeding up production with KENNAMETAL-tipped tools. Wright Aeronautical Corp., for example, specify KENNAMETAL on most steel cutting jobs in their Paterson, N. J., plant.

KENNAMETAL is also reducing machining time of parts for trucks, tractors, railroad cars, locomotives and other auxiliary equipment so vital to National Defense.

Tool designers can easily adapt KENNAMETAL to special tools . . . and increase production of hard steel parts from 30 to 50% with present machines and personnel. Send us your B. P.'s or drawings—no obligations.

Turning Nitralloy steel cylinder barrels (230-240 Brinell) for "Cyclone" engines at Wright Aeronautical Corp. Speed, 500 ft. per min.

McKENNA METALS Co.
500 LLOYD AVENUE
LATROBE, PENNSYLVANIA, U.S.A.

When you order or write about products described in TDM PROGRESS please mention the publication.

Shape Die Finishing Equipment Reduces Cost of Drawing Dies

SUBSTANTIAL die price economies in round hole dies have been available for several years by providing cored dies for the user to finish in his own die shop by a simple procedure. Research work continued in the search for a practical, inexpensive method for providing the same economies in shaped dies.

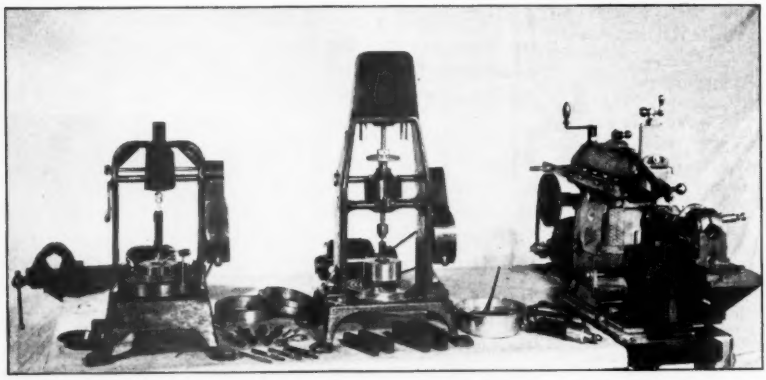
As a development of this research, the Carboloy Company, Inc., announces that shape dies in low priced cored form, with special equipment for rapidly finishing such dies as well as for re-sizing shaped dies in use, are now available. The line comprises standard hexagon and square rough cored dies in a wide range of sizes, covering all ordinary requirements. The dies are designed to require a minimum of stock removal for finishing, the cored shapes being virtually identical to the usual forms of drawing dies—with a 16 degree approach angle and a 30 degree back relief angle.

The special equipment, made available direct to the user, consists of three machines: a 7″ Atlas shaper equipped with a special table fixture for producing laps; a die sizing machine for all sizing and bearing work on shaped dies; and a die shaping machine for lapping of entrance angles, bell opening and back relief. An electric hand lapping device (see illustration) for finishing and polishing is also provided.

Recommended for use with this equipment are laps of mild steel, to be used with various grades of boron-carbide or diamond powder as lapping compounds for roughing and finishing the dies.

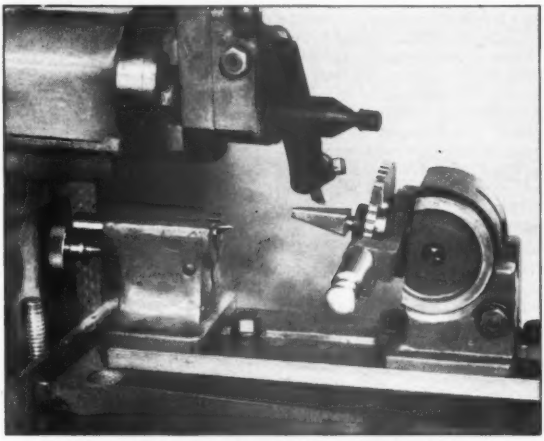
All three machines have the same basic action—a short high speed reciprocating stroke. All embody a motor driven eccentric, which in turn imparts a reciprocating motion to the vertical spindle.

After the required die shape is determined, laps of the same shape as the bearing, but with .010″ taper in their entire length, are used. The number of laps required depends on the amount of stock to be removed—a die with .030″ stock would require 3 laps for sizing. To reduce set-up operations and simplify the making of laps, the dividing head and foot stock is mounted on a sub-plate on the shaper table fixture—producing a .010″ taper in 3½″. This sub-plate swivels and is set at a 5 degree angle to the stroke so that feed



Left to right: The Carboloy Die Shaping Machine, Carboloy Die Sizing Machine, Hoover Multi-Purpose Tool (on table) and 7″ Atlas Shaper with special table fixture for producing die laps.

marks will be at an angle to the axis of the lap which—combined with the use of lapping compound—produces a filing action on the die.



Close-up of fixture showing lap set in collet with head tilted to desired angle.

Finished laps are placed in the die shaping machine. Laps for producing entrance, approach, bell and back relief angles, also are of the same shape as the cross sections they are to produce, but are smaller in size. In lapping the angles, the lap is reciprocated by the vertical spindle. At the same time, die and spindle are rotated slowly by hand.

Spring tension maintains a uniform pressure of the lap against the portion of the die at the rear of the machine, so that as the die is rotated, all faces and corners are lapped in turn.

The finishing or polishing hand tool (Hoover Multi-Purpose Tool) also employs laps, reciprocated at high speed through an electric motor driven eccentric with a short stroke—about ⅛". The tool is used mainly for polishing the surfaces.

To machine angle laps, the work is mounted in a collet and the tilting dividing head is set at an angle corresponding to the angle of the die the lap is to finish. A protractor scale is provided on the tilting dividing head.

To finish a die with this equipment, the die is first placed in the bearing sizing machine, lapped to within .010" of finished size with 100 grain boron-carbide, and to .005" of size with 220 grain boron-carbide.

It is then placed on the die shaping machine and the various angles are rough lapped with 220 boron-carbide. The bearing is then semi-finished lapped on the sizing machine to .002" using No. 5 diamond powder. The profile is next blended with the hand tool, using No. 5 diamond powder. The bearing is next lapped to .0001" of size on the sizing machine, using No. 6 diamond powder, and then finished with a wood lap using the same diamond powder. Alternately with this final operation, the hand tool is used to reblend and repolish the profile of the die, using No. 6 powder.

Bulletin D-108, "Equipment for Finishing and Re-sizing Carboloy Shape Dies", giving full working procedure, will be sent on request. Write Carboloy Company, Inc., 11122 E. 8 Mile Ave., Detroit, Mich.

Crucible Steel Appoints Atlantic Branch Manager

Mr. M. J. McKeever, who has been representing the Crucible Steel Company for 15 years, has been appointed manager of the Atlanta Branch of the Crucible Steel Company of America, located at 381 Whitehall Street. The Atlanta Branch serves the users of tool and die, alloy and specialty steels in the southern states.

Recent Industry Publications

BLANCHARD SURFACE GRINDER. Catalog No. 220 describes and illustrates the precision grinding operations that can be performed on the No. 18 grinder. Executives and department heads responsible for the precision grinding of tooling for production will be interested in the examples of special tools, dies and molds ground on this machine. It is claimed that finely finished surfaces can be produced in a very short time without danger of heating the work. The operating mechanisms, grinding wheels, and attachments are detailed and their advantages described. Instructions for the operation of the machine, together with complete specifications, are included. Write the Blanchard Machine Company, 64 State Street, Cambridge, Mass., for Catalog No. 220.

FIBRO FORGED SOCKET SCREWS, Catalog 30, describes in detail the method originated, developed and patented by The Holo-Krome Screw Corporation in the manufacture of Socket Screws. Specifications of the socket screws, hollow set screws, socket head cap screws, stripper bolts, wrenches and wrench sets, with prices, standards of Socket Set Screws and Socket Cap Screws, formulas for dimensions, Threads and Screw Thread Data, Thread Length and Body Length Tolerance combine to make Catalog 30 a buyer's guide for users of socket screws. For a copy of this catalog, write The Holo-Krome Screw Corp., Hartford, Conn.

"CROMOVAN TRIPLE DIE STEEL FOR HIGH PRODUCTION," a booklet by the Firth-Sterling Steel Company, gives complete technical data and typical job applications of this high-carbon high-chromium non-deforming, deep hardening die steel. Cromovan Triple Die Steel is particularly recommended for very high production runs. A copy of this booklet will be sent on request. Write Firth-Sterling Steel Co., McKeesport, Pa.

LINDERME TWO-SPINDLE ADJUSTABLE DRILL HEAD, for small drill presses, a four-page illustrated bulletin gives the detailed specifications of the two sizes of this sturdy, light, quickly adjusted drill head that is also adaptable to tapping operations. For a copy of this bulletin, write Linderme Machine and Tool Co., 12250 Coyle Ave., Detroit, Mich.

"THE ART AND SCIENCE OF GRINDING," a 48-page booklet, reviews the development of modern abrasives, the history and progress of the Sterling Company and the types of abrasive wheels developed by them. A section of 40 questions about grinding wheels and their answers is a feature. Tables of correct operating speeds, wheel circumferences and technical rules and formulas make the booklet very useful. A complete line of tool room wheels, bricks, sticks, segments and chucks are manufactured by this company. For a copy of "The Art and Science of Grinding," write The Sterling Grinding Wheel Company, Tiffin, O.

KNU-VISE CATALOG NO. 4 SUPPLEMENT, a bulletin just issued, illustrates a number of the rapid action toggle clamps manufactured by this company; giving specifications, applications, suggestions and instructions for installing clamps. For a copy of Catalog No. 4 Supplement, write Knu-Vise Incorporated, 16841 Hamilton Ave., Highland Park, Mich.

PHOENIX-LESTER DIE CASTING MACHINES. Two bulletins, one on the HHP-2 Die Casting Machine for zinc, the other on the HHP-3 and HHP-3X, high speed, high pressure Die Casting Machines, interchangeable between zinc (HHP-3) and aluminum, brass or magnesium (HHP-3X). Both Bulletins describe the advantages in design and operation offered by these machines. For either or both bulletins, write The Phoenix Machine Company, 2711 Church Ave., Cleveland, O.

GERSTNER TOOL CHESTS. Catalog 36 illustrates, gives full specifications and prices for the complete line of toolmakers' chests made by this company. This well-known line has been used and recommended by tool and die makers for over 30 years. For a copy of Catalog 36, write Gerstner Tool Chests, 56 Columbia St., Dayton, Ohio.

WALTON TAP EXTRACTORS. Folder 132 lists the Walton extractors, known and used all over the world for 30 years. Stock sizes from No. 4, machine screws to 1½" in 2, 3 or 4-flute styles. Write The Walton Co., 88 Allyn St., Hartford, Conn.

GORTON ACCESSORIES CATALOG, with the cutters, cutter blanks, double end mills, ground tool burrs, chucks and collets, jig boring tools, vises, tables and grinding wheels all described, is available to interested shop men. Full specifications, prices and ordering instructions are given. The Gorton 375-2 and 265-5 Cutter Grinders are also included. For a copy of Gorton Accessories Catalog, write George Gorton Machine Co., 1119 13th St., Racine, Wis.

WITTEK ROLL FEEDS FOR PUNCH PRESSES, Bulletin WF-339, gives full data on single, double and compound roll feeds and reel stands made by this company. Schematic views and instructions for setting up are included. Specifications, price list and an inquiry form for engineering assistance make the Bulletin very practical. For a copy of Bulletin WF-339, write Wittek Manufacturing Co., 4305 W. 24th Pl., Chicago, Ill.

KENNAMETAL TOOL ROOM CHART. An inch rule and a protractor for measuring tool dimension angles useful in tool and die shops is incorporated in this chart. A chip breaker design for turning bar stock and forgings as well as an efficient tool design for a facing tool for turret lathes is illustrated. A copy of this chart will be sent on your request by the McKenna Metals Company, 500 Lloyd Avenue, Latrobe, Pa.

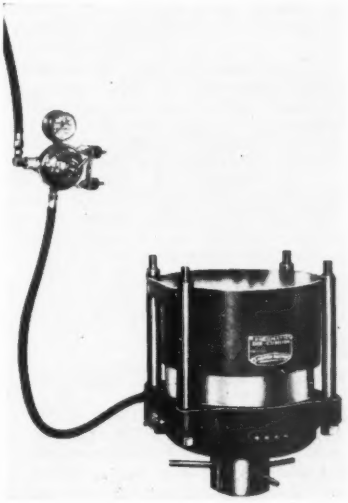
ILLINITE HIGH SPEED CUTTING TOOLS. A new reference text on metal cutting problems summarizes helpful data on the correct design, selection and use of cutting tools. Builders of tool room products will be interested in the sections on shaper cutters, milling cutters, including metal slitting saws, end mills, inserted blade, plain and side milling cutters, tool bits,

(Please turn to Page 44)

Dayton Rogers Announces New Model "D" Universal Pneumatic Die Cushion

THE Dayton Rogers Manufacturing Company, Minneapolis, Minnesota, announces their new Model "D" improved Universal Pneumatic Die Cushion. These new improved die cushions are now made in seven sizes, from 6 to 14 inches, have drawing capacities for deep drawing work from 2 to 8 inches, and can be used with or without surge tank reservoirs.

Each cushion is supplied with a combination reducing regulating control



valve and pressure gauge. The die cushion may be mounted directly to the bottom side of the bolster plate, for all draw ring and pressure pad control operations, or they may be spaced away from the bolster plate to any desired distance to allow blanks or slugs to pass through the punch press bolster plate.

The correct height of the pin pressure pad is predetermined and maintained by the hand-wheel, adjustable feature, thus compensating for bolster plate thickness variation, sharpening and grinding of dies, and the change of die design.

The cylinder and piston is inverted on the section which serves as a pin pres-

(Continued on Page 46)

GEORGE SCHERR CO.

PRECISION TOOLS FOR GOOD MECHANICS

These tools have been especially selected for accuracy, precision workmanship and value. All are necessities in a good mechanic's tool box.

Reed Two Inch Micrometers with 1/10000" Vernier.

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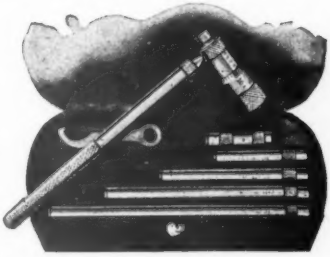
The MECHANIC'S OWN Ultra-Chex set. Accurate to 8 millionths. Five blocks 1"—.500"—.250"—.125"—.0625". Essential for toolmakers. Price $12.50 complete in case. *Order now.*



Reed Inside Micrometer. Accuracy guaranteed. Measures from 1½" to 12". *Write for folder showing 30 other types of Reed Micrometers.*

GEO. SCHERR CO. INCORPORATED 128-B Lafayette St. New York, N. Y.

When you order or write about products described in TDM PROGRESS please mention the publication.

Recent Industry Publications

(Continued from Page 42)

cut-off tools, drills and reamers, counterbores and miscellaneous forming tools. One section describes and illustrates the complete line of machines manufactured by the Illinois Tool Works. These include cutter and hob measuring machines and the die filing machine No. 376. There are 45 pages of engineering data. Of special interest to tool and die builders is the table of cutting speeds, weight of high speed steels, and a hardness conversion chart. Price information on standard tools is included in a supplement enclosed in a pocket in the inside back cover. Executives and interested department heads may secure a copy of this 300-page book by writing the Illinois Tool Works, 2503 North Keeler Ave., Chicago, Ill., requesting Catalog "E".

GS MACHINISTS' FOLDER, illustrating, describing and pricing a number of measuring and gaging tools sold by the George Scherr Co., Inc., is now available for distribution to tool rooms and die shops. Scales, rules, calipers and dividers, combination sets and several gages are listed. For a copy of GS Machinists' Folder, write George Scherr Co., 128-B Lafayette St., New York, N. Y.

ALLEN SCREWS HOLD—Allen Screws by cold-drawing and "pressur-formd" and by perfected threading—Cap Screws are "duo-process" threaded; are strong, and resist loosening under vibration. Allen accuracy holds work true to close-tolerance limits. Call your local distributor or write The Allen Manufacturing Company, Hartford, Conn., for a copy of descriptive folder G-21.

"LIGHT WHERE YOU WANT IT—PLUS PROTECTION", is the subject of a new bulletin illustrating the installation of Marvel Shields on stationary and surface grinders, sawing and filing machines, milling machines, universal tool and cutter grinders, lathes and other tool room machines. Accurate setting of verniers, micrometers and other finely graduated tools is insured, according to the manufacturer. Several sizes and styles are illustrated. A copy of this bulletin, PR-16, will be sent upon request. Write The Boyer Campbell Company, 6540 Antoine Street, Detroit, Mich.

TEMPERING AND DRAWING FURNACES, a pictorial bulletin offering helpful suggestions on uniform and accurate tempering and drawing of tools, dies and similar tool room products. Construction features are described and complete specifications are included. Write for Bulletin No. 83, Despatch Oven Company, Minneapolis, Minn.

FLAT GROUND STOCK CHART. A wall chart offering suggestions for the proper heat treatments of items made from "Red Streak" flat ground stock. Standard stock sizes with net prices are listed. Decimal equivalents of fractions from $\frac{1}{64}$" to 1" are given in millionths. Representative jobs illustrated are templates, jigs, fixtures, gages, punch and die facings, guides, stripper plates and similar tool room parts. For a copy of this chart, write Simonds Saw and Steel Company, Deparment TDM-12, Fitchburg, Mass.

DOALL SAWS—A handbook presenting actual performance records of metal cutting bandsaws on different materials and various jobs. A selector chart, suggesting the saw pitch, tooth style, temper and cutting speeds, will be of interest to operators in tool rooms and die shops. The booklet will be sent at your request by the DoAll Company, 1203 Thacker Street, Des Plaines, Ill.

DIMENSIONAL CHART FOR EXPANSION BOLTS has been issued by the Rawlplug Company, Inc. Measuring 15"x20" the chart gives many tables for machine bolts and machine screws, together with the proper size anchor to use in connection with each. The correct size of the hole to be drilled is also included. A copy will be sent on request to the Rawlplug Company, Inc., 102 Lafayette St., New York, N. Y.

DIES, TOOLS AND SPECIAL MACHINERY. Catalog No. 40 of S. B. Whistler & Sons, Inc., Buffalo, N. Y., gives the full technical descriptive material on the line of Universal Perforating Dies made by this company. Representative perforating die assemblies with directions for setting dies are illustrated by engineering drawings and point-by-point procedure to be followed. The Whistler Step Control, a mechanism for pre-setting variable operating cycles, is illustrated and described. A very useful Press Data Sheet on which information required for the use of the Whistler Universal Perforating Dies is listed is included, perforated, as the last page in the Catalog. The parts used with this patented die are also listed. For a copy of Catalog No. 40, write S. B. Whistler & Sons, Inc., 753 Military Road, Buffalo, N. Y.

MARTINDALE MOTOR-FLEX UNITS and rotary files and burs are described and illustrated in the Martindale Catalog No. 23 recently published. Single and multi-speed ball-bearing motors in three sizes, with suspension, tripod, short pedestal and floor type bases are in the line. Three sizes of sheath, core and handpiece cover a wide range of grinding, reaming, engraving, die sinking and other operations. Martindale Rotary Files and Burs are of 18-4-2 high speed steel, left-hand cut. For a copy of Catalog No. 23, write The Martindale Electric Co., Edgewater Branch, Cleveland, O.

MOUNTED POINTS AND WHEELS is the subject of booklet TD-43 issued by the Norton Company. Nearly 200 standard sizes and shapes are illustrated and described. Their value in removing surplus material on dies and molds will be of interest to tool room supervisors. Write Norton Company, Worcester, Mass., for a copy of this booklet.

THE VERNON NO. 0 Horizontal Milling Machines—a plain miller, a hand miller, hand screw feed and longitudinal power feed—are the subject of this new bulletin. Specifications and features of the Vernon line designed for efficient precision work at a low investment and operating cost. Write Machinery Manufacturing Co., Dept. 40, P. O. Box 155, Vernon Br., Los Angeles, Calif.

2½ Million Billion Billion Gages

By W. F. Schaphorst, M. E.

I DARE say that every tool designer is familiar with those famous "gage blocks" that are so extremely accurate. They are used by most if not all tool makers. There are 81 blocks in a complete set.

By combining the blocks in various ways the toolmaker can get almost any desired measurement, and that measurement is "accurate".

But I doubt whether many toolmakers are aware of the extremely large number of combinations that are possible. In an effort to determine the total number of possible combinations or "gages" that can be built up out of the 81 blocks this writer ran into some astounding results which he believes will astound other toolmakers. This is the way the author went at it.

One Block. If you have but one block, you also have but one gage. There is no such thing as a "combination" with other gages because there are no other gages. But now let us add one block.

Two Blocks. It is an easy matter to show that with two blocks there are *three* combinations or gages: each block separately, and one gage when they are used together, like this: a, b, and ab.

Three Blocks. You now have *seven* gages: a, b, c, ab, ac, bc, and abc.

Four Blocks. Here you have a total of 15 gages as follows: a, b, c, d, ab, ac, ad, bc, bd, cd, abc, abd, acd, bcd, and abcd.

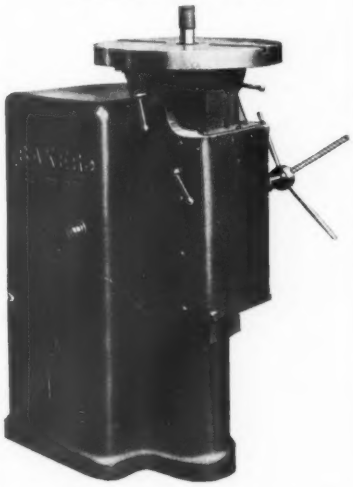
Five Blocks. Now we have a total of 31 gages as follows: a, b, c, d, e, ab, ac, ad, ae, bc, bd, be, cd, ce, de, abc, abd, abe, acd, ace, ade, bcd, bce, bde, cde, abcd, abce, abde, acde, bcde and abcde.

Continuing in this way I found that the 81 blocks will produce 2,417,500,000,000,000,000,000,000 gages. This number is not exact, as it was computed with the aid of logarithms. But it is close enough for all practical purposes. To work the whole thing out "longhand" would have been too big a job for this writer.

In connection with the above figure, here is another interesting truth. Let

(Continued on Page 46)

Save Valuable Tool, Gage and Die Making *Time*
by using
BAKER
Contour Grinder



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Convenient working height, complete visibility.

Vertical spindle mounted on large precision anti-friction bearings. Three speeds from Vee Belt drive.

Cam actuated reciprocating action, which can be disengaged when dressing the wheels.

Well ribbed 18" table with T-slot to front and rear. Mounted to provide angles for grinding of angular relief in dies, etc.

Wheels quickly interchangeable and held securely.

Quick acting capstan control of table slide.

Assembly protected against grindings and dirt.

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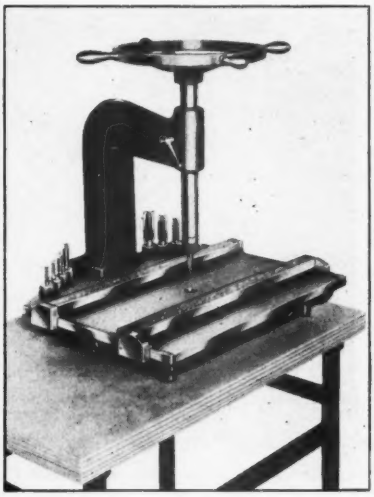

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Aluminum handwheel with four inserted steel handles.
Bracket arm, semi-steel casting bottom scraped to insure spindle is perfectly square with base.

Send for Circular

THE VIKING TOOL & MACHINE CORP.
6 Main St. Belleville, N. J.

Model "D" Pneumatic Die Cushion

(Continued from Page 43)

sure pad, making it possible to drop the pin pressure area to the maximum of the drawing stroke by releasing the air pressure and shutting off the supply so the pin plate stands out of the way for blanking and piercing operations when not needed.

PUBLISHER'S NOTE—The Dayton Rogers Mfg. Co. state that this new model "D" improved Universal Pneumatic Die Cushion will not be ready for the market until December 1st. Advance information is now available. Write the company at 2821 South 13th St., Minneapolis, Minn.

2½ Million Billion Billion Gages

(Continued from Page 45)

us say that Adam and Eve had a complete set of 81 of these blocks, and they decided to produce every possible combination. They found that, by working together industriously, they could produce a different combination every second.

At that rate, working constantly day and night, without stopping to eat, sleep, or die, they would finish the job in 76,500,000,000,000,000 years. In other words, by this time they would merely be in the very early stages of their job.

New DoAll Contour Sawing Booklet

Recently published by Continental Machines, Inc., of Minneapolis, Minnesota, is an interesting folder entitled "8 Different Jobs Show DoAll Advantages Over 8 Basic Cutting Methods".

This folder shows by actual photographs the comparison of the DOALL Contour Sawing method of removing metal with such conventional machining methods as shaping, turning, milling, nibbling and torch cutting. The comparison is made very interesting by showing the precision work swiftly completed on the DOALL machines and the savings in time and material which result.

A copy of "8 Different Jobs Show DoAll Advantages Over 8 Basic Cutting Methods" will be sent on request. Write Continental Machines, Inc., 1303 S. Washington Ave., Minneapolis, Minn.

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Buy With Confidence

● This directory of products lists for ready reference the names of manufacturers and dealers whose sales to Tool·Die·Machine PROGRESS readers have established them as dependable in every sense of the word. They merit your consideration.

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● Your mention of Tool·Die·Machine PROGRESS will be appreciated.

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Forging and Casting Corp., Ferndale (Detroit), Michigan.

BOLTS—Stripper
Allen Mfg. Co., Hartford, Conn.

Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago, Ill.

Die Supply Co., 1390 E. 30th St., Cleveland, Ohio.

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C. C. Craley Mfg. Co., Shillington, Pa.
Precision Tool Co., The, P.O. Box 155, Brooklyn, N. Y.

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Bokum Tool Co., Inc., 49 W. Hancock St., Detroit, Mich.

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Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago, Ill.

Die Supply Co., 1390 E. 30th St., Cleveland, Ohio.

CALIPERS
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George Gorton Machine Co., 1119—13th St., Racine, Wisconsin.

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CASTINGS—Air and Oil Hardening Tool Steel Cast to Shape
Forging and Casting Corp., The, Ferndale (Detroit), Mich.

CASTINGS— Nitri-Cast-Iron
Forging & Casting Corp., The, Ferndale (Detroit), Mich.

CHUCKS—Collet
The Tomkins-Johnson Co., 630 North Mechanic St., Jackson, Mich.
George Gorton Machine Co., 1119—13th St., Racine, Wisconsin.

CLAMPS—Die
Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago, Ill.

CLAMPS—Toggle
Danly Machine Specialties, Inc., 2121 S. 52nd St., Chicago, Ill.
Detroit Stamping Co., 344 Midland Ave., Detroit, Mich.
Knu-Vise, Incorporated, 16841 Hamilton Ave., Highland Park, Michigan.

CLAMPS—Toolmakers
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George Gorton Machine Co., 1119—13th St., Racine, Wisconsin.
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CUTTERS—Hard Carbide
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The Walton Co., 88 Allyn St., Hartford, Conn.
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Hamilton Tool Co., The, 222 North B Street, Hamilton, Ohio.
Grobet File Co. of America, 3 Park Place, New York City, N. Y.
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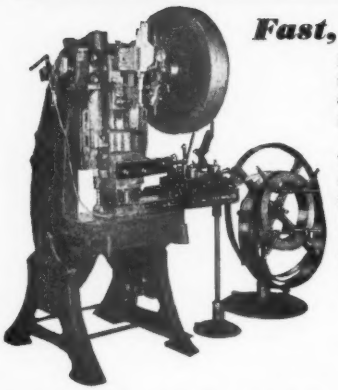

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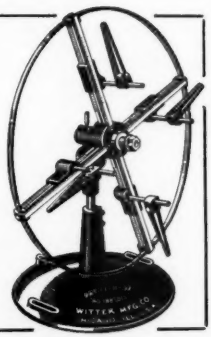

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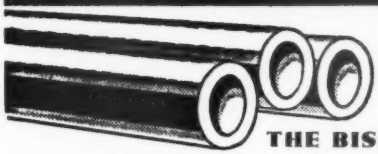

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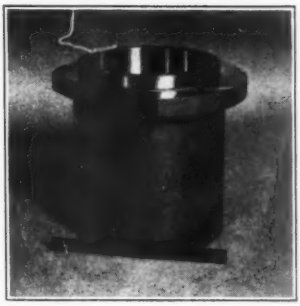

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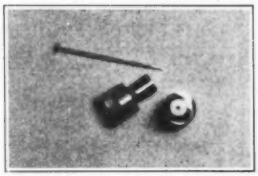

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Onsrud Turbine Tool Room Grinder

The Onsrud MD-1 Turbine Grinder, a high speed (50,000 R.P.M.) precision hand grinder, is in use in many tool rooms and die shops because of its ability to remove material at a controlled rate; it is convenient, and because of its centralized, balanced drive, it is not affected by overloading, and the cooling action of the expanded air enables the unit to run continuously at less than room temperature.

The patented impulse reaction turbine rotor is said to be exceptionally efficient. The MD-1 weighs only 1 pound 15 ounces, and with vibrationless speed and automatic centrifugal force oil feed the unit may be used all day without tiring the operator or causing any possible damage.

A circular, "Power Unparalleled", on the MD-1 Turbine Grinder will be sent to interested shopmen. Write Onsrud Machine Works, Inc., 3914 Palmer St., Chicago, Ill.

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A double spur or combination spur and internal gear, ball bearing mounted on drive shaft eccentric, meshes with a stationary internal gear. In mesh with the secondary gear is either a spur or internal gear which is solid and concentric with the output shaft. Eccentric drives initial spur around pitch line of the stationary internal gear. Since initial spur and secondary gear are solid, the speed of the latter is controlled by ratio between initial spur and stationary gear.

To obtain large ratios, a small difference in number of teeth between spur gear and internal gear is used. This makes the pitch line of the spur almost conform to that of the internal gear. A large number of teeth are engaged, increasing the load-carrying factor.

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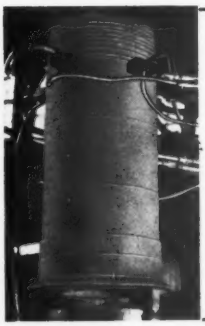

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The LAKESIDE STEEL IMPROVEMENT CO.
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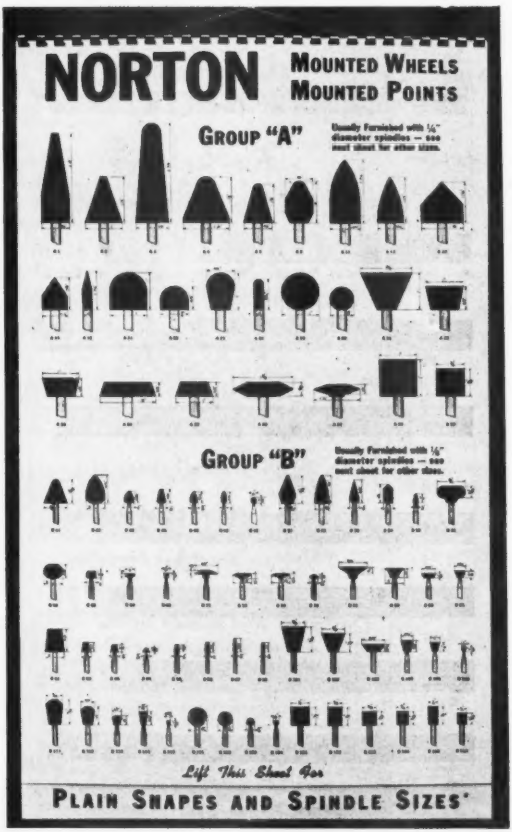
New Norton Mounted Point and Wheel Chart Now Available to Tool Rooms and Die Shops



TO facilitate the selection of small mounted points and wheels, the Norton Company has published a valuable two-page wall chart. This chart will be of particular value to die shops and tool rooms. On the first sheet are actual size illustrations of the complete Norton line of spindle-mounted points, all dimensioned and numbered. The second sheet lists all standard sizes of mounted grinding wheels, with standard spindle sizes, and instructions for ordering.

The chart is made of durable stock, measures 13"x17", has a plastic binding and cord, and is designed for quick reference.

The Norton line of almost 200 standard mounted points and wheels with spindles of stainless steel includes many widely used in tool, die and mold work and for precision parts manufacturing.

This chart is available to shop men in all industries.

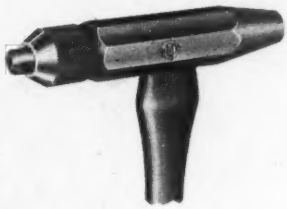
For your copy of Mounted Point Chart, write to Norton Company, Worcester, Mass. Please ask for it on your department or company letterhead.

When you order or write about products described in TDM PROGRESS please mention the publication.

Rubber Retaining Ring Holds Type In New Inspector's Marking Hammer

A NEW inspector's hammer, the RR-1, which simplifies holding of type in hammer by means of a rubber retaining ring, is announced by Jas. H. Matthews & Company. The ring is made of a very tough and durable synthetic rubber. It is inside the knurled segment which screws onto the end of the hammer. Type is quickly and easily changed by loosening the knurled segment; a slight twist presses the rubber against the type, making it impossible for type to come out while in use.

This new development has enabled the Company to reduce costs by eliminating the use of pins, clips or springs for holding type. It is also unnecessary to slot type for this hammer, which also aids in reducing costs.



Steel type can be made in one or more characters for use in this hammer. It can be made in inspector's initials, code symbols or trade mark design. It can be made "sharp face" for marking metal products and side grain of wood, or "flat face" for marking wood, fibre or other products of soft materials.

For complete specifications of Inspector's Hammer RR-1 and other marking devices write Jas. H. Matthews & Co., 3904 Force Street, Pittsburgh, Penna.

"Die Designing and Estimating"

"Die Designing and Estimating", advanced series (Die Estimating, by George Dannes) is now in use in a number of schools and training programs. Copies are still available at $1.55 postpaid. Send orders direct to this publication.

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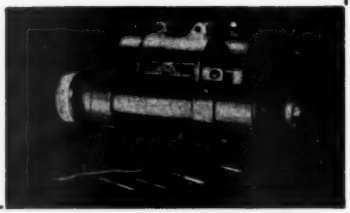

A Pneumatic Stripping Device for an Injection Mold

(Continued from Page 24)

stripper jaws. In this design the mounting bracket and cylinder head are integral, a design that is more or less routine in a specialty contract shop which builds hydraulic and pneumatic controls as well as a standard line of tools, jigs and fixtures. This design can easily be varied to make use of a standard air cylinder which may be purchased for flange mounting.

The Base

The base plate (detail 11) for the fixture is made of cold rolled or machine steel. The shallow nest is shaped or milled out by cuts all the way across the plate. A gage bar (detail 1) is screwed to the far side to stop the loose bar in the proper position to line up the casting with the stripper jaws. Socket head cap screws are shown for fastening the gage bar. Counterbored holes are provided to fasten the plate to a bench. The plate is cut off short at the end opposite the cylinder so the handle of the loose bar may be used in inserting it in the fixture.

Mounting Bracket and Cylinder Head

The mounting bracket and cylinder head are shown in detail 2. This is a bar of steel which is screwed to the base plate and supported by the brace (detail 12). This bar contains the packing gland (detail 8) and the pipe tap for the air inlet and outlet (detail 9). The cylinder head is counterbored to receive the cylinder which is retained by the flange (detail 13). The flange is screwed on the outside thread of the cylinder, and tap bolts hold it to the cylinder head. The cylinder (detail 14) is a piece of steel tubing, honed to a smooth bore, with the piston and rings fitted to it. The plug (detail 15) in the rear end of the cylinder is welded in, and contains the air passages with pipe tap (detail 10). The piston rod is shown at detail 7.

The Stripper Jaws

The stripper jaw bar (detail 6) is made of brass, to avoid injuring the cores in case of accidental contact. This bar is cut out as shown on Fig. 17, which is an end view. The leading edge is beveled where the loose bar slides under the jaw, as there is no other provision for holding the stripper up when the loose bar is not in the fixture. The stripper is relieved around the lower edge where it would otherwise wear on the cut off line of the mold. This relief protects the loose bar half of the mold and insures a sharp cut off, with no flashing. A tapped hole is provided for fastening to the piston rod.

Other Details

Detail 3 shows the loose bar in place in the fixture. Detail 4 shows the casting, and detail 5 shows the spur and runners. The fixture is designed to be operated by means of a standard four way, foot-operated valve.

McKenna Announces New Carbide Tool Material

A new straight tungsten carbide grade of Kennametal, to be known as grade K4, has just been placed on the market by McKenna Metals Co., Latrobe,

(Continued on Next Page)

When you order or write about products described in TDM PROGRESS please mention the publication.

(Continued from Page 56)

Pa. Said to have a 15% greater strength than other tungsten carbide of the same hardness, K4 has a hardness of 92.0 Rockwell A and a strength of 223,000 lbs. per square inch. It has a thermal conductivity similar to other tungsten carbide tool materials, namely 0.19, which, together with its high wear-resistance, makes it particularly applicable to the machining of hard materials such as cast iron, plastics, porcelain, hard rubber, glass, silicon aluminum, hard bronze and other non-ferrous materials.

The illustration shows a tool tipped with Kennametal K4 on the stationary post of turret lathe, set in position for a rough cut across the face of a Pomona jet pump discharge head at the Pomona Pump Co., Pomona, Calif. Note that the cut is interrupted across the six holes on the face, yet the Kennametal tool took these "jump" cuts without being damaged in any way. The tool on the turret arm is also tipped with Kennametal K4 and is used to rough and finish the inside diameter of this upper face. According to the pump manufacturer, use of Kennametal tools resulted in accurate, close-fitting parts and more heads machined per grind of tool.

Complete information, together with the price list on Kennametal grade K4 tools and blanks, will be sent upon request to McKenna Metals Co., 500 Lloyd Avenue, Latrobe, Pa.

Here's a Fact that will Interest YOU Mr. Engineer!

To get one accurate cam, one customer spent several years charting and cutting experimental cams at a considerable labor and material expense.

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Manufacturers of
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(Cont'd on Page 60)

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Tools with reputation

Chicago Rawhide Hammers and Mallets, manufactured from genuine Java Water Buffalo hide, are made by a firm with fifty years experience in producing quality products from rawhide. These tools make pounding safe on easily damaged surfaces. They are enduring. They are accurate. Rawhide does not "mushroom", crack or crumble. Even in unskilled hands they are safe because rawhide, tooled, compressed and tightly rolled, has resilience which cushions hard blows.

● Chicago Rawhide Hammers are made with malleable heads and replaceable faces. Mallets are made in a dozen sizes to meet every requirement.

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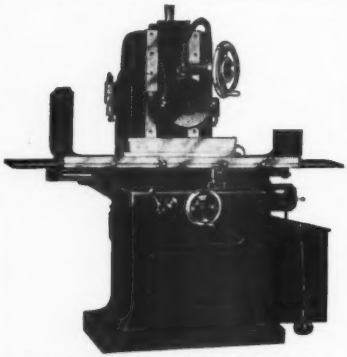

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ELIZABETH, N. J.

Meehanite Offers Wheel Chart

A HANDY wheel chart (illustrated), which contains complete engineering data on all the various types of

Meehanite castings available to industry, has been prepared by the Meehanite Research Institute of America, Inc. The wheel quickly reveals the physical properties of general engineering castings as well as Heat, Corrosion, and Wear Resisting types.

A chart will be mailed free upon request to Meehanite Research Institute of America, Inc., 311 Ross St., Pittsburgh, Pa.

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Drills two holes at once, engineered for all types of drill presses and is especially adaptable for small presses such as Canedy Otto, Demco No. 15 and similar presses. Drill centers ⅞" to 6", speeds up to 3600 R P M, capacity drills $\frac{1}{16}$" to ½". We make two sizes, the smaller, with aluminum gear case, weighs only 9½ lbs. Roller and ball thrust bearings. Same head with attachment may be used for tapping.

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DETROIT STAMPING CO.
344 Midland Ave. Detroit, Mich.

When you order or write about products described in TDM PROGRESS please mention the publication.

Progressive Pierce, Cut-Off and Form Die

(Continued from Page 22)

ASSEMBLY, TRYOUT, DEVELOPMENT
Column F—see Table, Fig. 28 and accompanying text
END DIE BLOCK—Det. 14—to shoe ..... 1.0 hr.

PERFORATOR—Det. 11—To Punch Plate—Det. 12 5
PUNCH PLATE—Det. 12—To Holder 1.5
STRIPPER—Det. 13—To Holder 5

DIE WORK ESTIMATING SHEET

		A	B	C	D	E	F
Det. 14	END DIE BLOCK	.6 .8	.5	.2 .6 1.1	5.6		1.0
Det. 9	DIE BLOCK	.6 .8	.7	.4 .9	1.7		1.0
Det. 2	FORM DIE BLOCK	.7 .9	.7	.3 .5 1.3	6.8		1.0
Det. 4	SPRING PAD	.5 .7	.3				1.0
Det. 1	STOP GAGE	.3 .2	.3 .3		.3		.5
Det. 10	CUT-OFF PUNCH	.5 .7	.6		4.8		1.0
Det. 3	FORM PUNCH	.7 .9	.7		2.4 .4		1.0
Det. 12	PUNCH PLATE	.4 .3	1.2				1.5
Det. 13	STRIPPER	.4 .3	.5		.5		.5
	DIE SHOE						
	(Screws and Dowels as per text)		1.9				
	(Spring Hole for Det. 4 Pad)		.5				
	PUNCH HOLDER						
	(Screws and Dowels as per text)		1.8				
	(Spring Holes for Det. 13 Stripper)		1.0				
Det. 11	PERFORATOR					2.0 .9	.5
	GAGE PINS					3.0	
	OIL PIN					1.7	
	DEVELOPMENT FOR BENDS						5.0
	TRYOUT						2.5
		10.3	11.0	5.3	22.5	7.6	16.5

Total 73.2 hrs.

Fig. 53

DIE BLOCK—Det. 9—to shoe 1.0
FORM DIE BLOCK—Det. 2—to shoe 1.0
PAD—Det. 4—to shoe 1.0
STOP—Det. 1, to Die—Det. 2—Including Fitting and Trimming 5
CUT-OFF PUNCH—Det. 10—To Punch Plate—Det. 12 .... 1.0
FORM PUNCH—Det. 3—To Holder 1.0

DEVELOPMENT FOR BENDS 5.0
(Considered 2 L-Bends)

TRYOUT 2.5

TOTAL Column F .....16.5 hrs.
Estimated hours of labor required .....73.2 hrs.

Colonial Broach Begins New Addition to Plant

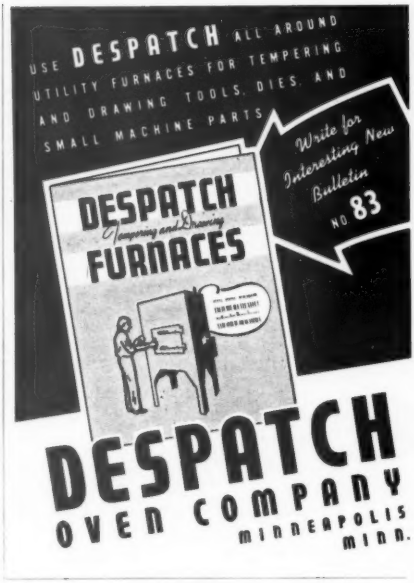
Colonial Broach Company of Detroit has begun construction of their new plant on Hoover Road. 20,000 square feet of additional space will be used for the manufacture of broaching machines, jigs and fixtures. The production of broaches, drill jig bushings, new method steel stamps, marking devices, etc., will be continued at the company's plant at 147 Joseph Campau St. The new plant will be in production early next year.

Jessop Appoints Safety Director

Ernest L. Mawhinney, Personnel Director of the Jessop Steel Company, Washington, Pennsylvania, has been appointed to execute a carefully planned safety program which will coordinate all safety measures previously in effect and will provide for the safety of new men who have recently been hired as a result of increased sales of Jessop Tool and Die Steels.

Modern Collet Increases Rebuilding Facilities

To meet the demand for machine rebuilding service, the Modern Collet and Machine Company, 401 Salliotte Street, Ecorse, Michigan, have just completed a new addition adjacent to their present plant. Doubling their capacity, this additional space will be utilized entirely for rebuilding operations. The new building has been designed for the most efficient type of "Production Line Work". The former space used for machinery building will be devoted to the production of replacement parts.



National Defense Notes

Over 20,000 industrial plants have been surveyed by officers of all arms and branches of the Army and of the Navy Departments. Most of these shops and plants have indicated by a voluntary written statement their ability and willingness to produce a specific item or items in an emergency.

* * *

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CONFIDENCE

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Ask for our Free Catalog.

GERSTNER TOOL CHESTS

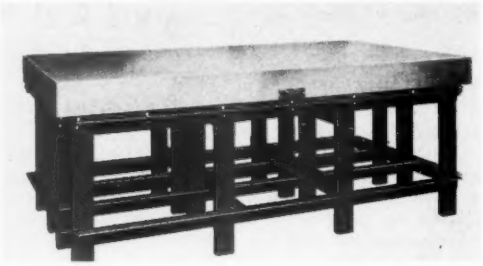
56 Columbia St. Dayton, Ohio

Challenge Machinery Improves Layout Surface Plates

A NEW, improved Layout Surface Plate for accurate layout and inspection work is announced by The Challenge Machinery Co., Grand Haven, Mich.

The Challenge Semi-Steel Layout Surface Plates are especially designed for use in shops and departments that require a true, rigid, smooth surface for assembly, layout, and inspection of parts or products in process.

The semi-steel plates are planer finish, smooth, square, and heavily ribbed underneath to prevent sagging. They come in standard sizes of 12 x 18 inches to 48 x 96 inches. Special sizes can be made to order. The all-steel arc-welded frame is provided with 32 lock leveling screws.



Plates may be purchased with or without the steel supporting frame.

For further information and prices on Challenge Semi-Steel Layout Surface Plates write The Challenge Machinery Co., Grand Haven, Mich.

At Bench or Machine

WOVEN RUBBER MATTING

Reduces Damage and Breakage
Lessens Fatigue
Assures Firm Footing
Prevents Tracking

Stock sizes or Custom made.

Write for free sample and estimate giving dimension of space to be covered.

WOLVERINE MAT COMPANY

5301 Grand River Ave. Detroit, Mich.

Armstrong-Blum Building; To Double Plant Capacity

The manufacturer of the Marvel line of hack sawing machines, band sawing machines, hack saw blades and kindred tools has begun construction of an addition which will double their present capacity. This expansion is particularly significant since the present modern plant was built as late as 1937. The entire plant will be a one-story, monitor type, daylight building.

When you order or write about products described in TDM PROGRESS please mention the publication.

New Lyon Die Truck Has Auto Type Steer

THE newest Lyon Die Handling Truck, furnished with Auto Type Steer, was designed for taking out or putting in heavy dies in presses where the space for maneuvering a truck is rather limited. Auto Type Steer at both ends not only helped maneuvering in close quarters but added stability to the truck.

A turning bar to which a removable handle is attached controls the turning of the wheels. This handle is arranged for hand drawing or towing by a power truck. The truck is arranged so that it may be drawn from either end. Wheels on either end may be locked in position for drawing at the opposite end. One wheel on each end is furnished with braking arrangement to hold the truck in position when loading or unloading dies.

The capacity of this truck is 8,000 lbs. The platform is 24″ wide by 60″ long by 30″ high. The wheelbase is 60″; overall length is 72″; wheel tread is 31″; overall width is 34″. Trucks of other specifications of similar design can also be furnished with either a stationary table as shown or with hydraulic elevating table so as to bring the table or platform at varying heights most suitable for different applications of die handling.

For further details on the Lyon Die Handling Truck with Auto Type Steer or other die handling trucks, write Lyon Iron Works, 516 Madison St., Greene, N. Y.

THE War Department is represented on 38 and the Navy Department on 56 American Standards Association (ASA) technical committees.

FOR WORLD-FAMED ACCURACY, EASE OF USE, AND LONG LIFE, CHOOSE

LUFKIN

TAPES • RULES • PRECISION TOOLS

Saginaw, Michigan • New York City

When you order or write about products described in TDM PROGRESS please mention the publication.

One Man and a "Portelvator"

No shop is completely equipped without it.

Lift and move 2000 to 5000 pound dies, jigs and fixtures easily and safely. This **Hamilton Portable Table** quickly overcomes its cost by eliminating costly mishaps and breakage and in actual time saved. Two standard sizes.

Also Special Sizes Up To 20 Ton Capacity

Write for circular and prices

THE HAMILTON TOOL COMPANY

220-248 North B Street Hamilton, Ohio

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Tools & Gages, Inc. 60
Variety Machine & Stamping Company ... 60
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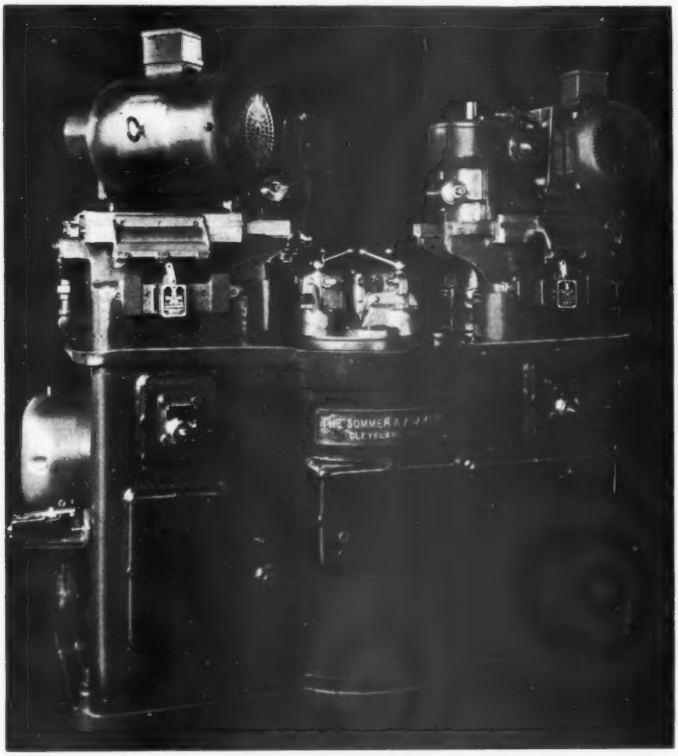
Walton Company 52
Wheelock, Lovejoy & Co. .....
Wittek Manufacturing Co. 50
Wolverine Mat Co. 64
Yohe Supply Co., Wm. S. .....

Another Type of Milling Machine

Designed, Developed and Built by Sommer & Adams



Three surfaces are milled simultaneously by this new indexing type Production Milling Machine. It has two heads, one with a single spindle and the second with two spindles. These heads are operated hydraulically and the machine is electrically controlled.

We are especially qualified by experience to design and build efficient production milling equipment. Tool, die and mold shop requirements are taken care of by our Cleveland No. 1 Vertical Milling Machine.

Please send us your requirements.

THE SOMMER & ADAMS COMPANY

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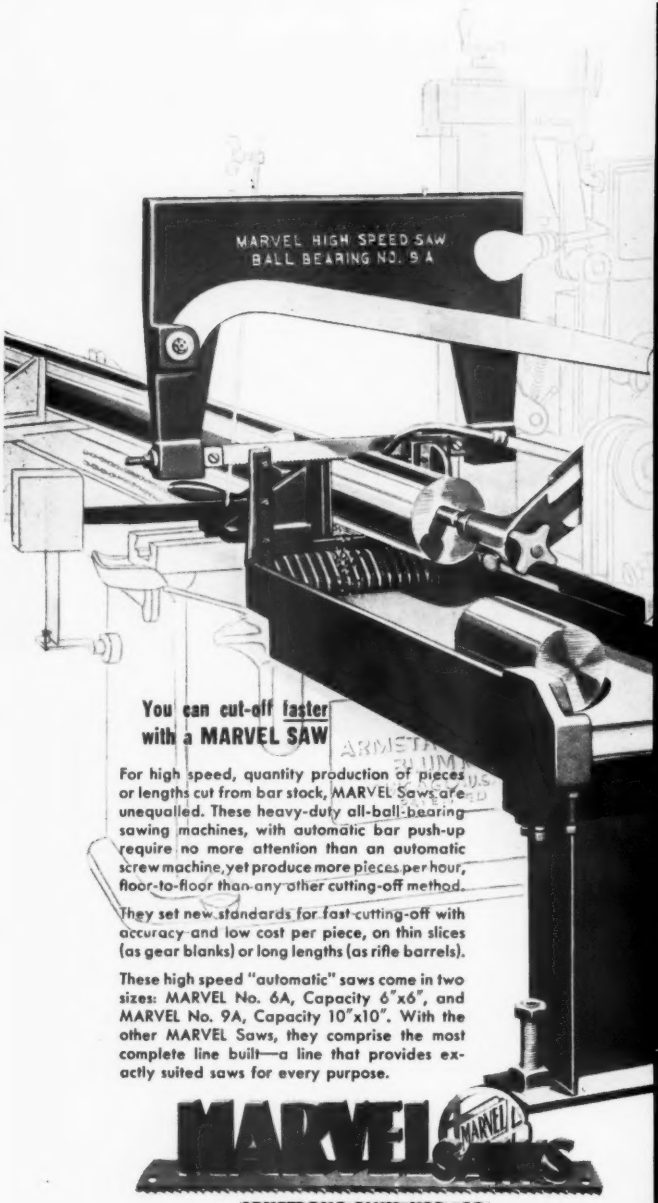

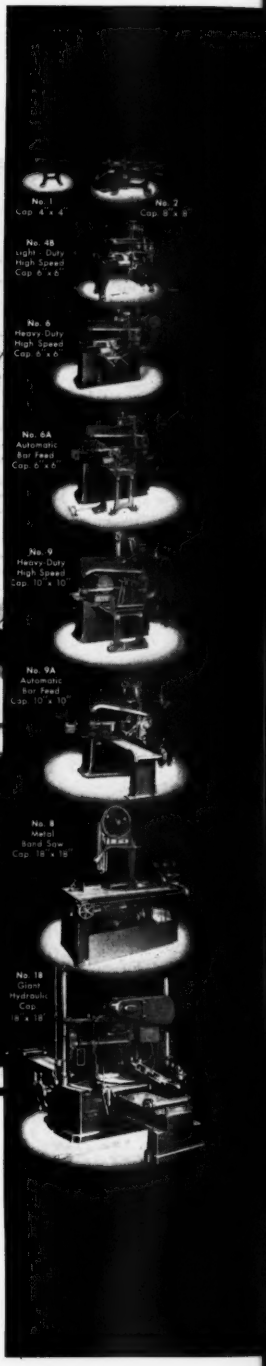

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